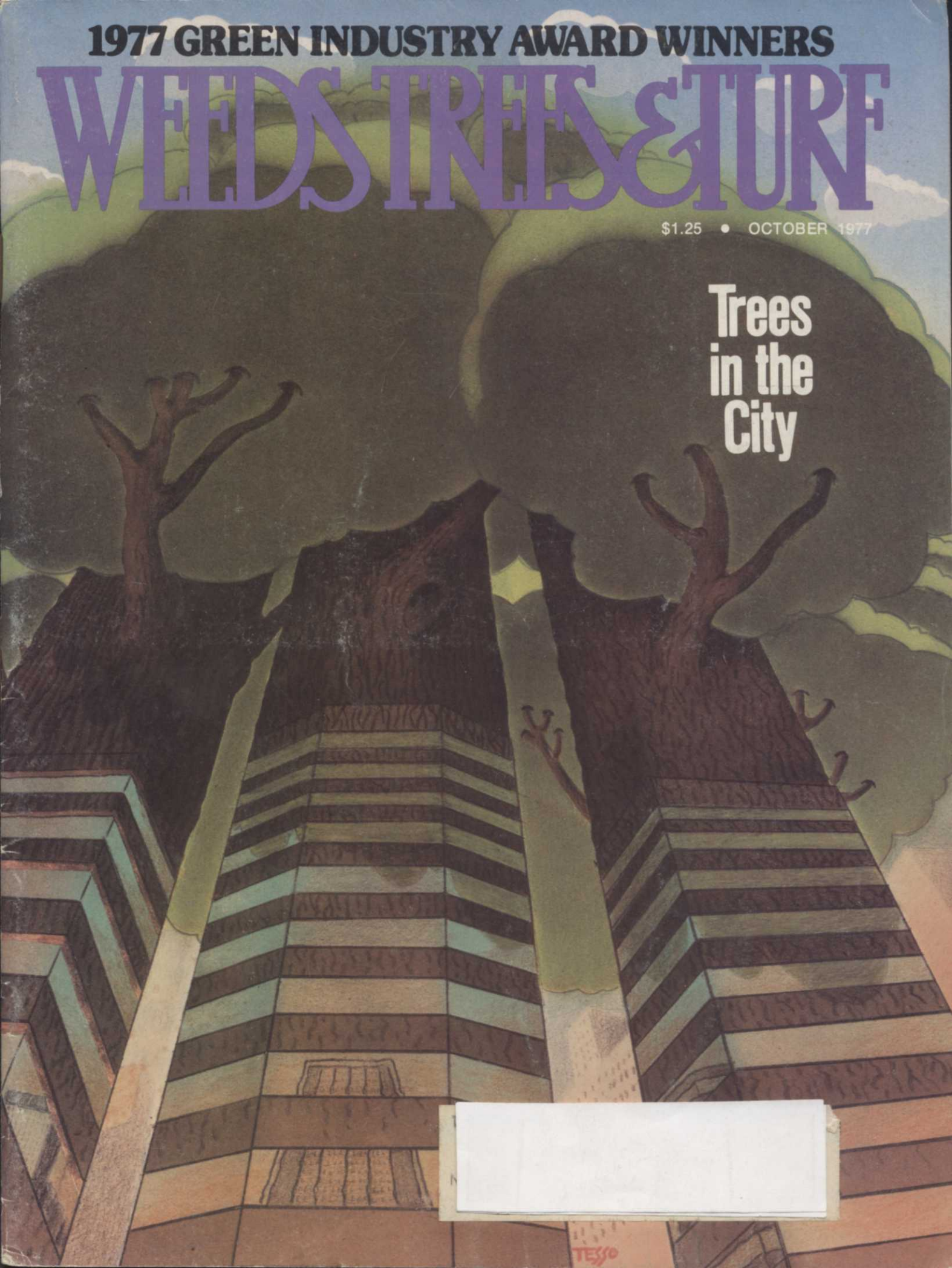
1977 GREEN INDUSTRY AWARD WINNERS

WEEDS TREES & TURF

$1.25 • OCTOBER 1977

Trees in the City



What can a hole in the ground do?

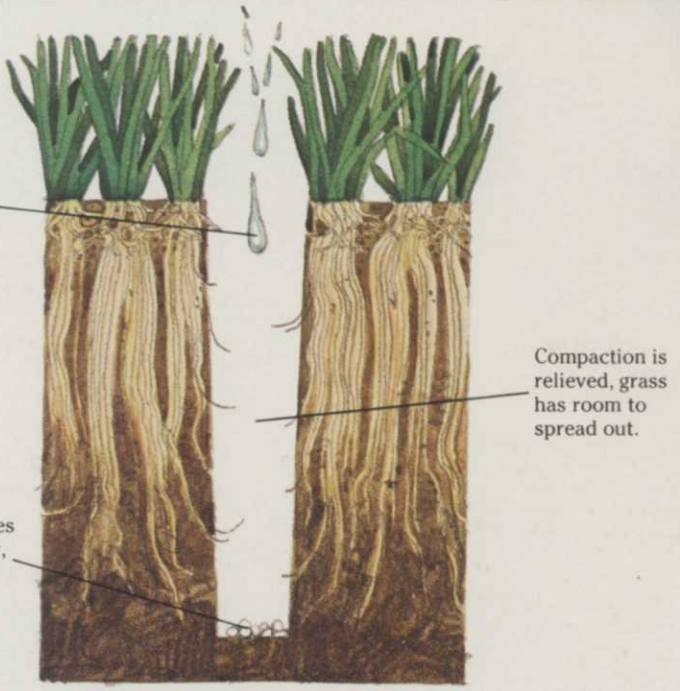
When your grounds become hard-packed from constant use and temperature changes, or if the ground is naturally hard, grass has a tough time growing.

The answer is aeration.

These holes allow air, water and fertilizer to penetrate to the root zone where they're needed. They relieve compaction, giving grass room to grow. New, more drought-resistant roots are stimulated. And the turf takes on a springy, soft feel.

Ryan makes two pieces of equipment specifically for aeration of parks, athletic fields, playgrounds, golf course fairways, or any large turf area.

The Ryan Renovaire® is designed to contour aerate compacted turf on hilly as well as flat areas. Its 12 tine wheels are mounted in pairs, operating independently to give both high and low spots equal penetration.


Moisture penetrates deeper, encouraging strong roots.
Compaction is relieved, grass has room to spread out.
Fertilizer reaches root zone faster, won't wash off.

The Ryan Tracaire® is used to aerate large level areas, especially athletic fields. Mounted by a 3-point hitch, it gets the job done quickly, easily, efficiently.

Both the Renovaire and the Tracaire can be equipped with coring, slicing or open spoon tines for aerating all types of soil in all seasons. Both can be used with a 12-foot-wide dragmat to break-up cores and groom the grass. And both are built to last, like all Ryan equipment.

Give your large turf areas room to breathe with the Ryan Renovaire and Tracaire aerators. You'll see the green, healthy difference a few simple holes can make.

Write for your free Ryan catalog today.

Ryan Aerators.
The turfman's timesaver.

®RYAN TURF-CARE EQUIPMENT
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Lincoln, NB 68501

 Circle 128 on free information card

WEEDS TREES & TURF®

OCTOBER 1977, Vol. 16, No. 10

Bruce F. Shank
Editor

Ron Morris
Assistant Editor

Ray Gibson
Graphics Director

BUSINESS STAFF

Hugh Chronister
Publisher

Richard J. W. Foster
General Manager

Dorothy Lowe
Classified Advertising Manager

Darrell Gilbert
Production Manager

Jack Schabel
Circulation Manager

ADVERTISING OFFICES

HEADQUARTERS: 9800 Detroit Ave., Cleveland, OH 44102 (216-651-5500)
Richard J. W. Foster, General Manager,
Ray Mooney, Regional Manager

NEW YORK: 757 Third Ave.
New York, NY 10017 (212-421-1350)
Steven Stone, Eastern Manager

CHICAGO: 333 N. Michigan Ave., Room 808
Chicago, IL 60611 (312-236-9425)
Joe Guarise, Midwestern Manager

ATLANTA: 3186 Frontenack Court, NE
Atlanta, GA 30319 (404-252-4311)
Richard Gore, Southern Manager

LOS ANGELES: 4311 Wilshire Blvd.,
Los Angeles,CA 90010
(213-933-8408)
John Sandford, Western Manager

SAN FRANCISCO: 615 Montgomery St., San Francisco, CA 94111
(415-982-0110)
Robert A. Mierow, Western Manager

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The seed that's changing the face of America.

Pennfine Perennial Ryegrass

The biggest breakthrough in the greening of America began in 1970. That's when turfgrass specialists at Pennsylvania State University completed development of a remarkable fine-leafed perennial ryegrass with all the advantages of ryegrass. And none of the drawbacks. They called it Pennfine.

Now, just six years later, the success of their undertaking is evident. On golf courses and athletic fields. In parks and cemeteries. And on public grounds across the country.

Proven in tests. Among the nine perennial ryegrasses tested over a five-year period at University Park, Pennsylvania, Pennfine ranked finest in texture. Most resistant to disease. First in density and decumbency (low growth).

The University Park test results were only the beginning. Over 5,000 test kits with seed samples were distributed over the entire country in answer to requests from turf professionals wanting to test Pennfine. The results confirmed the University Park findings.

Most importantly, Pennfine established a new standard of mowability. Some other perennial ryegrasses, cut with the same mower, left ragged, fibrous tops that quickly turned brown. Pennfine's softer fibers cut smooth and clean.

Proven from coast to coast, from North to South. Pennfine's durable beauty has been demonstrated at prestigious sites all over America. From the lawns at an historic national landmark to the greens at a nationally-renowned golf course.

Besides possessing the ability to stand up under heavy traffic, Pennfine germinates rapidly. That makes it ideal for winter overseeding in the South. And, its non-competitiveness allows a smooth spring transition to bermudagrass.

Proven quality control under the Plant Variety Protection Act. You can be sure that all Pennfine Perennial Ryegrass meets the same high standards, because Pennfine is covered by the Plant Variety Protection Act.

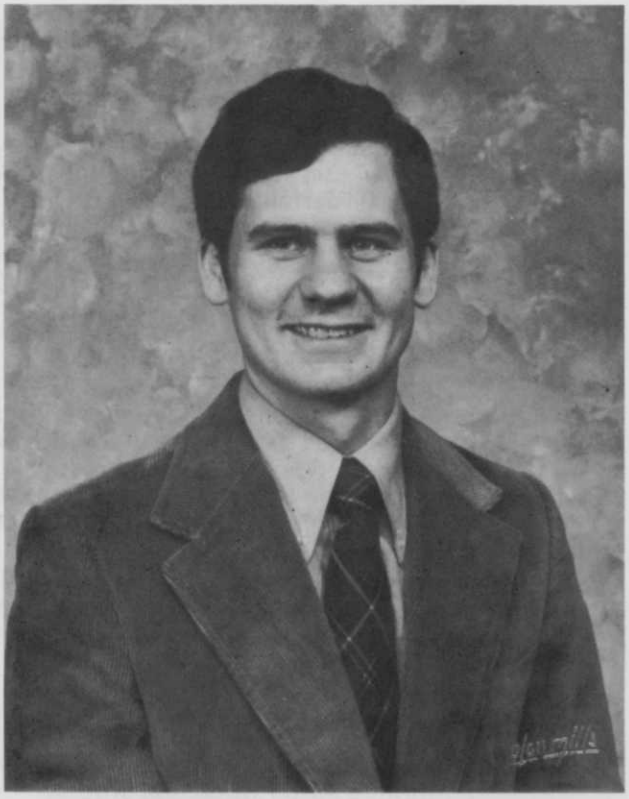
That means every pound of Pennfine is certified. You are assured, by law, that it's produced exactly as intended by the original variety breeder.

Prove it to yourself. To learn more about how Pennfine is changing the face of America—and how it can work for you—write: Pennfine, P.O. Box 923, Minneapolis, MN 55440.

Pennfine
PERENNIAL RYEGRASS

The best thing growing.

Circle 133 on free information card



Hello Green Industries

For nearly four years I've been behind the scenes at Harvest waiting for the opportunity to be your editor. Now that it has become reality, I feel grateful to Harvest and challenged by your needs.

In the coming year, I have four chief goals:

First, to involve as many readers as possible in the magazine. I plan to arrange question and answer columns with knowledgeable experts in your field. The letters section will be enlarged to fit opinions from more readers than in the past. I hope to create a board of industry advisors to help direct the magazine.

To direct the magazine's content toward the primary industry sectors is the second goal. Ron Morris and I have outlined four primary subject matter areas to cover every month, not just in special issues. These are, as the magazine's name signifies, weeds, trees, and turf, plus increased emphasis on landscaping and rights of way.

To make the magazine graphically more functional is the third objective. Beginning with the January 1978 issue, WEEDS TREES & TURF will look different. The information you need will be easier to find, easier to read, and more pleasing to the eye. You will be able to catch quickly the information most important to you at the time, and then go back for more thorough coverage when you have time.

The fourth goal is to bridge the technical/layman gap. It is my contention that the people who have the most significant information to pass on, are often not the easiest people to understand, primarily because their work is disguised in scientific jargon and poorly explained statistics. There is middle ground and I intend to find it.

This takes cooperation from both sides. It's not easy to ask a researcher to write in lay terms. From his bachelor's degree on, he (or she) was taught to write in big, multisyllabic words with latin names scattered throughout. As editor of Pest Control magazine, I discovered that it can be done, without sacrificing a reference image, which business publications in technical fields must have.

In addition, there will be other improvements, such as a steady supply of how-to-material for training purposes; industry data to point out trends; and news from industry sectors, regions, and organizations.

As you can see, Ron and I have a lot to do. It's not easy to make a good magazine even better. We would appreciate any comments or suggestions from you. After all, it is your magazine.

Bruce F. Shank

Bruce F. Shank, Editor

There are 785 different tree species...

And they all thrive on Ross Super Tree Stakes and Ross Super Fruit Tree Stakes!

Dependable **Ross Super TREE STAKES** provide once-a-year feeding of trees, shrubs, and evergreens with a high food value analysis of 16-10-9 PLUS iron and zinc formulation.

New **Ross FRUIT TREE STAKES** contain 16-5-10 PLUS iron and zinc to provide precise, pre-measured feeding of all fruit trees: apple, pear, apricot, plum, peach, cherry, all citrus, berries and fruit bearing shrubs.

Each commercial case contains approximately 155 stakes . . . enough to feed more than 35 trees of 3″ diameter. There are 20 solid nylon pounding caps to simplify driving into the toughest soil.

For best results, place stakes at drip line of tree, using three stakes for every 2″ of trunk diameter. Water does the rest, carrying plant food to the feeder roots.

Two great once-a-year formulas . . .

- **16-10-9 For Beautiful Trees & Evergreens**
- **16-5-10 For bigger, better Fruit**

Contact your nearest Ross Daniels distributor for Ross Super Tree Stakes and Ross Super Fruit Tree Stakes. If unavailable in your area, order direct from: ROSS DANIELS, INC., P.O. Box 430, West Des Moines, Iowa 50265. Use this coupon to order.

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Please ship _____ cases,
check enclosed.

ROSS Fruit Tree Stakes
Commercial Pack,
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Please ship _____ cases,
check enclosed.

Approximately 155 stakes per case, weight 44 lbs.
1-3 cases, $35.00 per case
4-11 cases, $30.00 per case
12 or more cases, $25.00 per case
Each case includes
20 Nylon Pounding Caps

Your name_____

Organization_____

Address_____

City_____ **State**_____ **Zip**_____

Make check payable to Ross Daniels, Inc.

Government News

State Certification

Maine and Utah applicator certification plans have been given "full approvals" by the EPA, according to notices published in the August 31 Federal Register. Colorado, Massachusetts and Nebraska are now the only states without an EPA approved certification program.

The notice on the Maine plan stated that the only comments on it were filed by the National Canners Association, and that the State's responses to the comments were satisfactory to EPA.

"Grandfather Clause"

The proposed Federal applicator certification rule, titled "Federal Certification of Pesticide Applicators in States or on Indian Reservations without an EPA-Approved Certification Plan", has a "grandfather clause" which would permit the EPA to "issue a certificate to an individual possessing any other valid Federal, State, or Tribal certificate without further demonstration of competency."

Under the proposal, commercial applicators would be certified by passing written examinations; be recertified every two years; keep and maintain records on use and application of restricted pesticides for at least two years and make the records available for inspection and copying by EPA representatives.

Record Requirements

The commercial applicator record-keeping requirements include: "(a) name and address of the person for whom the pesticide was applied; (b) location of pesticide application; (c) target pest(s); (d) specific crop, commodity, and site to which the pesticide was applied; (e) year, month, day, and time of application; (f) trade name and EPA registration number of pesticide applied; (g) amount and concentration in pounds or gallons per unit or percentages of active ingredient per unit of the pesticides used; (h) types and amounts of pesticides disposed, methods of disposal, date(s) of disposal, and location of disposal sites; and (i) other information as the Administrator may deem appropriate."

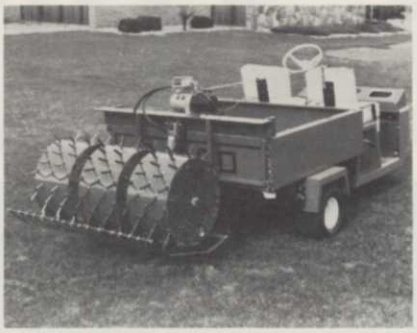
Heptachlor/Chlordane

The National Cancer Institute (NCI) has concluded, in its final validated report, that in separate bioassays of chlordane and heptachlor, mice receiving either compound in feed responded with significant incidences of liver cancer, but that rats given either compound did not have liver cancer increases that could be related to the chemicals. The final NCI results also showed that both chlordane and heptachlor were possible causes of thyroid tumors in rats, although that report cautioned that this evidence was not conclusive.

Dedoes Aerators Can Be Quickly Mounted To Most Any Type Vehicle

Garden Tractor

The Dedoes new Two-Drum Aerator has 72 pluggers and aerates a 25″ Swath. Mounts to any 10-14-16 H.P. or Larger Garden Vehicle. Includes a self-contained hydraulic unit. *If weight is needed a separate Weight Tray is available.*



Utility Vehicle

Attaching the Dedoes Aerator to your utility vehicle is a simple matter. The Basic Frame Unit allows you to adapt to any equipment in a matter of minutes. *Available with hinged doors and removable sides. Collects plugs internally.*

Specialty Equipment

Even a vehicle built for specific use, can be used with the Dedoes aerator to give quick, neat aeration for small areas.

The complete Aerator that offers speed and quality in addition to the following:

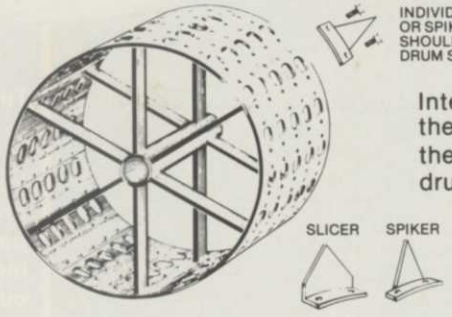
- 3″ Tine in 3/8, 1/2, or 3/4 diameter.
- Pivoting Tine gives you a clean hole.
- Hydraulic principle utilizes weight of vehicle for down pressure.
- TCA551 Model gives you close to 2″ Tine spacing.

New Items Now In Production

Pointed Tine

Dedoes now has a pointed tine available for tees and greens which gives up to 3″ penetration in the turf.

Separate Slicers and Spikers



Interchangeable with the tines on the Regular Dedoes drums.

Manufactured by

Dedoes Industries, Inc.

1060 West Maple Road, Walled Lake, Michigan 48088
(313) 624-7710

The Standard.

Turf playability: it's your responsibility. When it's right, you know it. When it's wrong, everyone seems to know it. When a piece of you is on the line, you don't want to leave anything to chance. You want the dependability of proven programs and products: products that set the standard by which others are often compared—products like Acti-dione® turf fungicides. They've set an industry standard during their more than 20 years of continuous use without evidence of fungus resistance. And today, Acti-dione acceptance continues to grow. That's got to be proof of reliability. Shouldn't you, too, join the growing rank of professionals who rely on the standard, Acti-dione turf fungicides?

TUCO

Division of The Upjohn Company

It's what reliable four-season spray programs are built on.

TUCO
Acti-dione®
Thiram
Broad spectrum
Turf fungicide
For Use On: Bentgrass, Bermudagrass, Bluegrass, Fescue, Ryegrass, and St. Augustinegrass
For the Prevention and Control of: Dollarspot, Fading-out, Gray Leafspot, Helminthosporium Leafspot, Large Brown Patch, Melting-Out, Pink Patch, Powdery Mildew, Rust, and Snow Mold.
WARNING!
HARMFUL OR FATAL IF SWALLOWED. KEEP OUT OF REACH OF CHILDREN.
See other warnings on back panel.

The cool, humid weather that encourages the development and growth of dollarspot, leafspot and melting-out in the spring also encourages their spread in the fall. Regular applications of Acti-dione TGF® on tees, greens, and fairways control diseases that are potential problems in autumn.

Pink and Gray Snow Mold organisms thrive under winter weather conditions. Control these diseases with Acti-dione® Thiram. Spray just before the first permanent snow cover and through the winter as thaw allows.

Fungi never have an off-season. They're active year-round. That's why it requires a Four-Season Disease Control Program to keep turf looking beautiful. Build your program around Acti-dione fungicides. They're the standard no matter what season you're in.

Stop turf-damaging insects with the proven insecticide —
PROXOL® 80 SP.

Circle 129 on free information card

Industry News

Cushman-Ryan training program offered again

More than 200 persons are expected to graduate this fall and winter from Cushman-Ryan's factory service training network.

Ivan Vagts, national service manager, said the 1977-78 curriculum includes 21 classes offered on a rotating basis in four cities. The specialized 2½-day classes are available to both Cushman-Ryan customers and dealer mechanics.

"We pioneered the factory service training network last year and were pleased with results," Vagts remarked. "So this year we've expanded our program."

Centers will be located in Atlanta, San Francisco, Lincoln, Nebraska, and Fairfield, N.J. The classes, which are scheduled to begin in November and run through January, will be conducted on a rotating basis.

Ryan classes will spotlight the aerification product line plus sod cutter equipment. The Cushman program includes comprehensive classes on engine repair and the drive train assembly.

Vagts said registration forms are available by contacting him or any Cushman-Ryan dealer. He suggested applicants select a first and second choice of attendance dates.

U.S. sulfur-coated urea facility planned

The first sulfur-coated urea facility in the U.S., and the second in the world, will be built in Columbia, Ga. by Ag Industries Manufacturing (AIM) Corporation, a subsidiary of Lakeshore Equipment and Supply Company, licensed through the Tennessee Valley Authority (TVA) under several patents. Construction of the plant's process equipment will begin after ribbon-cutting ceremonies scheduled for mid-October with plans for operation in early 1978.

TVA has been testing sulfur as a coating for urea since 1957 at the National Fertilizer Development Center in Muscle Shoals, Alabama.

Although test results were promising, conditions in the U.S. didn't favor large-scale marketing of the product until recently, according to Ronald A. Smith, project manager for Lakeshore. The method TVA licensed AIM to use took about 15 years to develop.

Currently, the only commercial plant in operation is in Canada, but there are pilot plants located at Muscle Shoals, Korea, Spain, and England, and the product is showing great international acceptance.

Covar fescue released for erosion control

Covar, a new grass that grows well in the dry regions of the Pacific Northwest, is expected to be used extensively to control erosion on rangeland, roadsides, ditchbanks and other sites.

Covar, a variety of sheep fescue, was developed at Washington State University and is being released jointly by WSU, the University of Idaho, Oregon State University, and the U.S. Department of Agriculture's Soil Conservation Service.

As a ground cover, the fescue grass tends to crowd out weeds. When seeded with other grasses, Covar controls erosion on steep rangeland and provides early spring forage for cattle.

Covar is adapted to most of the Pacific Northwest east of the Cascades and grows well in regions with 10 to 18 inches of rainfall.

Scientists at NCSU will study CO_2 loss

Scientists at the North Carolina State University Agricultural Experiment Station will study a complex and little understood plant phenomenon known as postillumination burst of carbon dioxide. The study will be done under a memorandum of understanding with the U.S. Department of Agriculture. Postillumination burst of carbon dioxide is the sudden release of substantial amounts of carbon dioxide by plant leaves when light is turned off. This loss of carbon dioxide, required for plant growth, may have undesirable effects on plant growth and yield. Knowledge about this plant phenomenon will help plant breeders to develop new improved varieties.

The two-and-a-half-year, $36,000 research project will be funded by USDA's Agricultural Research Service (ARS).

Dr. T. E. Wynn will be the principal investigator for the experiment station. Dr. D. E. Moreland is the sponsoring scientist for ARS.

Pennfine produced under federal act

Pennfine ryegrass, developed at The Pennsylvania State University, has become the first Penn State variety produced under the new federal Plant Variety Protection Act.

The new law stipulates that seed growers wishing to produce a new variety may do so under a contract wherein the growers must meet regulations for quality seed as set by the breeder (Penn State).

The law thus provides for proprietary ownership, wherein an individual or organizaion owns and controls a variety. In this way, the contract assures the breeder that seed will have the superior qualities originally built into the new variety, according to Dr. Joseph M. Duich, developer of Pennfine ryegrass.

The Seed Production and Introduction Corporation (SPIC) is handling all contractual arrangements for producing Pennfine ryegrass. Already, four competing national seed companies are producing Pennfine under contract with SPIC.

From a Bird's Eye View

PENNCROSS

CREEPING BENTGRASS

Looks Greater, Putts Straighter

Elkhorn Valley
Golf Course
Mehama, Oregon

The putting grass superintendents prefer. Easy to establish, lower maintenance costs.

FOR FREE TURFGUIDE, WRITE
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1349 CAPITAL ST. N.E.
SALEM, OR 97303

PENNCROSS BENT GRASS

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TEE•2•GREEN CORP.
1212 WEST EIGHTH STREET
KANSAS CITY, MISSOURI 64101
(816) 842-7825

People on the Move

Donald E. MacKenzie has been appointed OSHA's field coordinator. He will be responsible for coordination of the agency's field programs and directives and will represent the interests of regional administrators in the development of program plans and policies. MacKenzie served as OSHA's regional administrator in Atlanta for more than three years and was regional administrator in Boston.

Dr. Edward C. Kostansek has been appointed research chemist in the Industrial Products Research group at the Minerals & Chemicals Division of Engelhard Minerals & Chemicals Corporation. A recent graduate of Harvard University, Kostansek completed his Ph.D. dissertation under Professor W. N. Lipscomb, the 1976 Nobel Laureate in chemistry.

Chevron Chemical Company has appointed **Stanley Kane** as plant manager of the Ortho Pesticide and Insecticide Plant in Maryland Heights, Missouri. He replaces P. G. Curnutte, who retires after more than 27 years with the company. Kane will be in charge of the midwest production facilities.

Five new members have been appointed to the Department's National Advisory Committee on Occupational Safety and Health (NACOSH). They are: **Don B. Chaffin,** professor, Department of Industrial and Operations Engineering, University of Michigan, **Ernest M. Dixon,** Corporate Medical Director, Celanese Corporation, **Andrea Hricko,** Health Coordinator, Institute of Industrial Relations, University of California, **Marcus M. Key,** School of Public Health, University of Texas, and **Claudia Miller,** private consultant, Chicago. **George H. R. Taylor,** executive secretary of the AFL-CIO's standing committee on occupational safety and health, has been reappointed to a fourth term.

Dr. Peter J. Schultz has been promoted to the position of Chief Environmental Scientist of J I Case Company. He will ensure that the company's worldwide environmental needs are being pursued aggressively. Schultz joined Case in 1972 as an environmental chemist at the Corporate Test Center in Racine.

Dr. David W. Pritchard has joined Stauffer Chemical Company as product manager-herbigation specialist, a newly established position created to deal with the various aspects of pesticide application through irrigation systems.

Cantu

Mazza

McCloskey

McLaughlin

Sullivan

David T. McLaughlin was elected chairman of the Board of Directors of the Toro Company. President of Toro since 1970, he will continue as chief executive officer. **John J. Cantu** has been named a director and president of the Minneapolis-based manufacturer.

Dennis V. McCloskey is Chairman of the 1978 103rd Convention of the American Association of Nurserymen. President of Windmill Nurseries of Franklinton, La., he has been a member of AAN since 1971, has served on the Association's Horticultural Standards Committee and has represented the Louisiana Chapter at previous conventions as both Lt. Governor and Governor. McCloskey also served on the Board of Directors of the Southern Nurserymen's Association.

Velsicol Chemical Corporation has announced the promotion of **Vincent Mazza** to Director of Marketing, Agricultural Business Group. His responsibilities include advertising, promotion, merchandising and market planning for Velsicol's chemicals in agriculture, industrial brush control, pest control and home, lawn and garden. Mazza began his career with Velsicol in 1959.

James M. Sullivan has been appointed advertising manager for the Industrial Divisions of Johns-Manville Sales. He is responsible for the advertising and sales promotion of all Johns-Manville industrial specialty items. Sullivan joined the firm in 1972.

Top management changes at Hercules were approved by the company's Board of Directors. **Alexander F. Giacco,** executive vice president and chief operation officer, is president, chief executive officer and chairman of the executive committee. **Werner C. Brown,** president since 1970, is chairman of the Board of Directors. **John M. Martin,** chairman since 1970, is honorary chairman and will remain an active Board member until his retirement in January of 1978.

MANHATTAN

Perennial Ryegrass

School grounds in St. Paul, Oregon gets plenty of traffic but still looks great.

Manhattan **fairways** at Elkhorn Valley Golf Course, Mehama, Oregon. Imparts beauty and wear tolerance to this mountain course.

Manhattan Perennial Ryegrass has those desirable characteristics long sought in a turf grass.
Consider these data facts in your turf program:

- Superior fast establishment.
- Long term performance.
- Depth of crown assures better recovery from turf damage, greater wear tolerance, holds better under short mowing.
- Good density . . . more competitive with unwanted weeds and grasses.
- Less thatch development.
- Maintains vegetative tillers.
- Performs better in fall, later in spring and summer.
- Resistant to brown patch.
- Dark green color.
- Deep rooted, requires less water.
- Fine leafed.

Manhattan fine leaf perennial ryegrass is the versatile grass. Excellent for golf tees and fairways, parks and athletic fields, home lawns. Developed at Rutgers University, New Brunswick, New Jersey, grown in Oregon under rigid certification and quality control.

Home lawn near Woodburn, Oregon after three years in 100% Manhattan.

Sprague **football stadium**, Salem, Oregon holds up well even in the soaking rains of Oregon's fall months.

For more information write:

Manhattan Ryegrass Growers Association
1349 Capital N.E.
Salem, OR 97303

Distributed by:

Whitney Dickinson Seeds, Inc.
52 Leslie Street
Buffalo, N.Y. 14240

Manhattan

"TURFTYPE"
PERENNIAL RYEGRASS

"The Versatile Grass for Professional Use"

Disease Stresses of Urban Trees

By

E. B. Himelick

Survival of trees in today's cities emphasize their tenacity and ability to adapt. Not only do they survive weather, insects and disease, but they manage to survive man's machinery, concrete and soil disturbances.

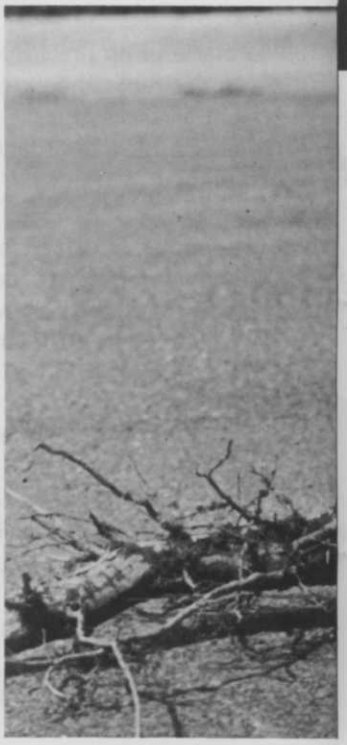
Even native tree species may be regarded as exotic when planted along streets and around homes, because of the many unnatural environmental stresses placed on them. The effects of clay fill, soil compaction, rapid runoff of water and the reflected heat from buildings are compounded by natural hazards.

The total effect of all stresses determines the vigor and ultimate survival of all plants. The evaluation of all potential stress factors must be considered in the selection of tree species for future planting.

Noninfectious Diseases

Environmental Stresses

Of all the stresses related to climate, prolonged dry periods and soil-water deficiencies have the greatest effect on the amount of growth a tree produces each year. The cambium growth either slows down or completely stops, depending upon the amount of available soil moisture. Drought will not only affect growth during the current growing season but can affect growth in later years. A summer drought affects the number of leaf



Feathery water sprout growth resulting from topping or dehorning as commonly practiced in some areas of the country.

initials formed in new buds, which produce shoot growth in the following year. A reduction in both the number and size of leaves directly affects the amount of carbohydrates and hormones produced the following year.

Frequently, tree declines are associated with excessive soil moisture, due to excessive rainfall, and with prolonged drought periods. Decline and permanent damage to the root system usually results. Some of the major diebacks and declines resulting from too much or too little moisture are birch, sweetgum, maple and ash dieback and oak and sycamore decline.

Other Stress Factors

Low-Temperature Injury

Plant tissues may be injured when temperatures drop near or below freezing. Freezing conditions following a gradual drop in temperature are seldom harmful to most trees after they have started to go dormant in the fall. However, a rapid drop in temperature following a period of mild weather can cause extensive damage. Trees exposed to winds or direct sunlight are more likely to be injured than those in sheltered locations. Low-temperature injury usually occurs on species planted outside their natural range, especially those moved from a mild climate to a severe climate.

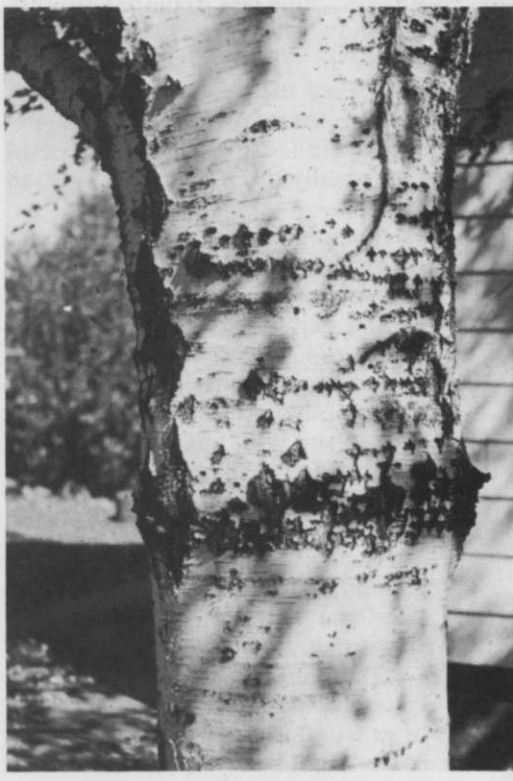
A sudden drop in temperature following a warm autumn may cause the death of plant tissues that are not mature enough to withstand freezing conditions. The injured tissue is often confined to succulent shoot growth that is still internally active beyond the point of normal growth cessation. Terminal dieback will become evident the following spring.

Low-temperature injury during the winter dormant season affects the roots, trunk bark, twigs, and vegetative and flower buds. This injury occurs following abnormal warm periods during the winter months. Poor drainage, the genetic character of the root system, lack of snow cover and soil type are other factors that contribute to root injury during the dormant period.

Frost cracks on trees are caused by the expansion and shrinkage of bark and wood, which cause internal mechanical stress and result in the cracking or splitting of the wood and slipping of bark at the cambium layer. Tree species commonly affected by frost cracks are London

Root decline associated with wet, poorly drained soil. All photos courtesy of Illinois Natural History Survey.

Mechanical girdling by a wire.



Sapsucker injury on white birch.

plane, oak, elm, maple, horse-chestnut, linden, tuliptree (yellow-poplar), and willow. Frost cracks on London plane trees often reopen when the air temperature falls to 8°F and remain open until temperatures warm in late winter. Usually these cracks never close completely, making entrance easy for insects and woodrotting fungi and eventually causing deterioration of the heartwood.

Frost-heaving many times affects newly planted trees. Ice formation in the friable soil around and under new trees often displaces or heaves the tree and causes root damage. Displaced trees lean and the displaced root systems do not settle to their original levels.

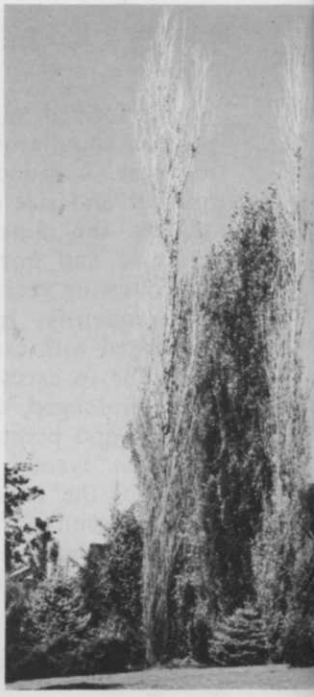
Soil Nutrient Deficiencies and Soil Pollution

Of the 16 nutrient elements commonly required for normal tree growth, nine are required in substantial amounts and seven are required in relatively small amounts. Abnormal metabolism may result if one or more of the essential elements are lacking, or if they are in abnormally high concentration in the soil.

Factors that regulate the amount of nutrients absorbed by tree roots are concentration of the nutrients, topsoil depth, texture and structure of the soil, type of subsoil, soil pH, and soil compaction. The greater the depth of the topsoil, the greater volume of soil with physical, chemical, and biological characteristics favorable for root growths. Soil texture and structure affect the water-holding capacity, aeration and nutrient content. Heavy clay soils afford poor water drainage, aeration and nutrient availability.

The subsoil is important becauase of its effect on the drainage of gravitational water from the topsoil. A tight heavy subsoil will cause frequent waterlogging of the topsoil during rainy periods. Soil compaction affects aeration and water infiltration into, and percolation through, the topsoil. Root penetration and development are poor in heavy, compacted, poorly drained soils.

Soils in urban areas, particularly along streets and around homes are often excellent examples of poor soil conservation and management. The refuse left from basements, foundations, storm sewers and water- and gas-line excavations is usually spread over the surface. This type of deep subsoil is often heavy clay, variable in nutrients, and low or lacking in organic matter. It usually contains limited amounts of both nitrogen and potassium and can be deficient in several of the other essential elements.



Sycamore decline believed caused by water stress and a canker disease.

The nutrient most often lacking in plant growth is nitrogen. There is considerable evidence that under natural conditions most of the nitrogen in the soil accumulates in organic forms from the biological fixation of atmospheric nitrogen. The bulk of the nitrogen absorbed from the soil by plants is stored in decomposed plant material. Microorganisms in the soil must break down plant material into simple inorganic components before the nutrients are re-used by trees. When nitrogen is lacking, it causes pale green foliage, stunted top growth, and yellowing or drying of the older leaves, especially during droughts. Good fall color on maple, oak, and many other tree species is often an indication of nitrogen deficiency and general poor vigor. Maples and oaks that have been fertilized in the spring, and given supplemental watering during dry periods, usually remain green longer in the fall and do not develop good fall coloration.

Chlorosis occurs on several tree species due to the lack of iron, manganese, magnesium, boron, and zinc. The most common deficiency of pin oak, sweetgum, maple, baldcypress, hackberry, white oak, and several other deciduous or evergreen species is the lack of iron or manganese.

Symptoms of iron chlorosis develop on pin oak when the soil pH is 6.7 to slightly more than 7.0. Many pin oaks appear normal for years when not disturbed by construction or other soil disturbance. Lawn fertilization and watering with city water often change the soil pH after a few years. Many fertilizers contain large amounts of calcium carbonate. Although this chemical

Numerous trees in a screen planting dying from Cytospora canker. Useful life expectancy is sometimes less than 10 years.

Pin oak chlorosis is a serious problem in soils with high pH.

does move slowly through the soil, frequent applications of calcium carbonate over the years will change the soil pH.

Some pin oaks growing in nursery rows and along streets remain a normal green color, while many others become chlorotic. This variation among pin oaks suggests that some genetic difference may occur and that it may be possible to select cultivars tolerant of high pH.

Stress Caused by Air and Soil Pollution

It has been estimated that more than 50 percent of the American population live in areas of constant air pollution. All urban trees are living in constant soil or air pollution of one type or another.

Gaseous air pollutants, such as SO_2, halogen compounds, ozone, ethylene gas, and nitrogen oxides cause visible foliage injury to different tree species.

Natural pollutants such as hydrocarbons from the conifers, methane gas from the marshes, hydrogen sulfide from decaying vegetation, air-borne soil particles, pollen, fungus spores, volcanic dust, and radiation have been in existence during the evolution of trees. For thousands of years, tree species have been naturally selected for surviving the environmental stresses caused by these pollutants.

Published reports indicate that 2,4-D and 2,4,5-T may cause extensive injury to foliage due to aerial drift of the spray and to volatile materials that evolve after application. Much of the injury was believed to result from improper application and former use of highly volatile forms of the herbicides.

Visible chemical injury on non-target plants is evident each year, and in 1975 over 10 percent of the tree and shrub specimens sent to the diagnostic laboratory of the Illinois Natural History Survey showed definite symptoms of chemical injury. A high percentage of the chemical injury resulted from the use of weed killers such as 2,4-D in lawn fertilizers and from surface spray applications. Much of the damage is apparently caused by applications that create fine particles easily carried by air movement to non-target plants.

Vascular Wilt Diseases

Oak wilt has caused loss of some oak trees in suburban areas of the Midwest where new homes have been constructed in stands of native oak. The recreational value of some parks and forest preserves has been lost due to the loss of oaks. Oak wilt is known to affect all species of oaks, but it is most serious among species of the red oak group. Oaks in urban areas do not appear to be threatened by this disease.

Many trees and shrubs are affected by Verticillium wilt, a vascular fungus disease. It is the only vascular disease that affects such a wide variety of unrelated annual and perennial plants. The disease is rare in forest stands but is becoming increasingly prevalent in ornamental plantings, especially in temperate regions of the world. Presently, 60 tree and shrub species and varieties are know to be susceptible. Symptoms can be difficult to diagnose on some of the less susceptible tree species. Trees weakened by the dis-

ease, because of the death of portions of the root system, may be more susceptible to the effects of other stress factors.

Leaf Diseases

Spray control is usually recommended for most leaf diseases to prevent loss in foliage and ornamental appearance. Loss of ornamental effect is often temporary, but loss of foliage, if severe, may have a long-term effect. Synthesis, movement, and storage of food reserves is lowered even in vigorously growing trees. Older and less vigorous, slower-growing trees are more seriously affected, since the decrease in growth is often greater the following year. Awareness of the disease susceptibility of various tree species to leaf diseases will permit proper timing of effective fungicide sprays. Improper timing of spray applications may make them worthless and expensive in time and money. Few leaf and canker diseases, except powdery mildew and scab, can be eradicated by fungicide spraying. Several leaf diseases are erratic in their severity and usually are important if heavy defoliation occurs early in the growing season for two or three consecutive years. Often it is more practical to apply water during drought periods than to spray. Unless trees are low in vigor, they will usually respond well to applications of fertilizer in the spring and supplemental watering during dry periods of the summer.

Control of Infectious Tree Diseases

There are at least four major concepts of control for infectious tree diseases: exclusion, eradication, protection, and resistance. Each of these control procedures is important in limiting tree loss from infectious diseases.

Exclusion

Exclusion refers to control procedures that prevent the movement of plant pathogens or disease agents into areas where they are not known to exist. Seeds and vegetative parts used for reproductive purposes are often treated to prevent the introduction of undesirable organisms into new areas. When symptoms or other signs of infectious organisms are present, the infected plant material can be culled. Disease agents, such as viruses in the seed or other plant material, are easily transmitted in plant material used for propagation and, therefore, are difficult to control. Nursery inspections for certification and state quarantines have been effective in limiting the movement of certain insects and diseases to new areas of the country. United States quarantines are adopted to control the importing and exporting of plant materials, and these materials are subject to inspection and in some cases fumigation before they are shipped.

Eradication

Activities associated with remov-

Before Dutch elm disease, shade and trees covered the landscape. After Dutch elm disease, or any devastating tree disease, we must start over.

ing or destroying all or parts of an infected tree constitute control by eradication. Destruction of diseased trees, removal of alternate hosts, and chemical therapy are procedures that may be used to control some of the infectious diseases we have in urban situations. Eradication of a canker disease on an individual infected tree is often the primary means of control; however, it may fail if the infectious organism has progressed into the trunk, or if the tree is weakened and subject to multiple infections throughout the branches and twigs. Control of Dutch elm disease by eradication of diseased elm trees has contributed to the significant decrease in annual loss in most communities that also spray to control the insect vector. Control of chestnut blight by eradication has not been effective, and all such efforts to lessen tree losses have failed.

Removal of alternate hosts to rusts has not proved practical in ur-

Continued on page 44

Sycamore anthracnose leaf diseases such as this tend to devaluate the home from the presence of a denuded tree.

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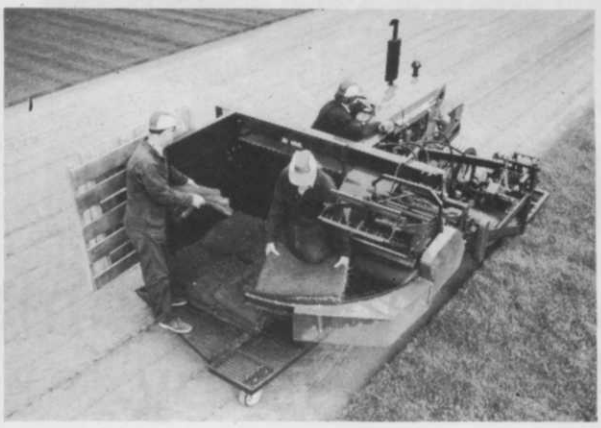

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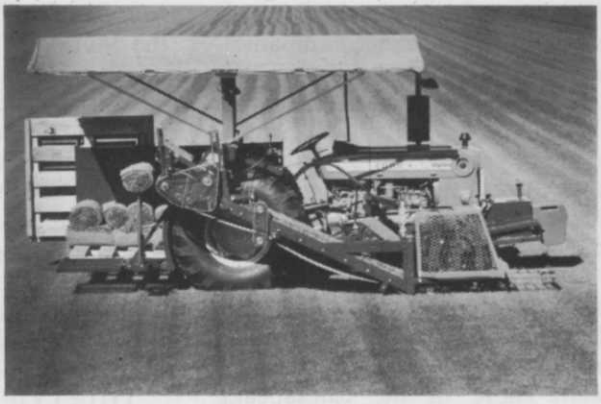

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Most property owners, while fully appreciating the esthetic worth of their landscape, are unaware that established trees and other plantings have monetary value that is recognized by insurance companies, real estate specialists and even the Internal Revenue Service. However, an appraisal by a qualified professional is required in order to establish the validity of any claim, and guidelines have been laid down for conducting the appraisal.

Appraisers were recently asked to set a dollar value on the 400-year-old Wye Oak in Wye Mills, Maryland. Located on Maryland's eastern shore of the Chesapeake Bay, the famous tree is probably the oldest living white oak in this country and is truly a cherished American landmark.

The magnificent giant oak is a sight of such spectacular proportions as to almost defy measurement. It rises to a lofty 95 feet and has a crown span of 165 feet, more than half the length of a football field. At about nine feet above the ground, the trunk measures eight feet in diameter, and at a height of four-and-a-half feet, its circumference is 27 feet eight inches.

A sturdy picket fence encompasses the tree at approximately the dimension of its outer branch spread. The tree sits, along State Highway 622, between a well-kept residence and an original one-room schoolhouse established in 1720. The tree is owned by the State of Maryland and is well maintained by the Maryland Park Service.

So what value did the consulting arborists place on this mighty oak? In a meticulously prepared official document, Fred Micha, writing for the arborists, stated in part:

> Having carefully considered information and data pertinent to this tree's size, species, condition, location and other arboricultural factors, it is our opinion that the value of this tree is:
> THIRTY-FIVE
> THOUSAND DOLLARS
> $35,000.00

The document also described the tree as being in "fair condition."

> It has a center core heartwood rot pocket. Thus it may be susceptible to wind throw and trunk breakage. It has had a constant maintenance program, being pruned and fertilized every two years. Its cabling system is extensive and properly done. One problem does arise in that it may become too top heavy and collapse at some future time. Possibly ground cables should be installed to prevent this type of destruction or damage.

The appraisal went on to state that the tree had received constant maintenance for the past 25 years at an approximate cost of $55 per year, thus increasing its value by $12,500.

The report concludes by stating that this species of tree is capable of living to a thousand years and that the Wye Oak, with an established maintenance program, can probably be preserved for another 200 years.

"Such an appraisal as this can be objectively undertaken because of the professional guidelines that have been established," said Ray Gustin, Jr., a 50-year veteran of the tree service and nursery business in Silver Spring, Md. "These guidelines have been adopted by the American Society of Consulting Arborists, the American Association of Nurserymen, the Associated Landscape Contractors of America, the International Society of Arboriculture, and the National Arborist Association." (Representatives from each of these comprise the Council of Tree and Landscape Appraisers.)

"The guidelines take into consideration species of plant, size, age, general health, location, site factors and individual professional judgment." Gustin worked with Micha and Dr. L. C. Chadwick in appraising the Wye Oak.

While the Wye Oak appraisal is a unique case, the practice of appraising trees and other landscape plantings is quite common. Property owners, recognizing the monetary value of their landscape, are increasingly calling in qualified tree and landscape professionals to make appraisals which can be used in filing insurance claims and in taking income tax deductions in case of damage to their trees or other plants. These professionals can also help the owner by seeing things he might miss, helping to correct the damage and prescribing remedies the owner may be able to do himself. The savings which the landscape appraiser may effect can far outweigh the nominal cost of an inspection.

For further information on tree and landscape values, write The Council of Tree and Landscape Appraisers, 232 Southern Building, Washington, D.C. 20005. □

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Esthetic Considerations in the Selection and Use of Urban Trees

By William R. Nelson, Jr.

Trees can provide a sense of movement and eliminate confusion.

Esthetics and function are equally important in the selection of trees that strengthen, reinforce and add beauty to urban space. The basic structure of a tree, its pattern of lines, the contour outline of its form and its basic habit of growth provide a basis for determining which types are suitable for which settings.

Line and Form

Line and form are the most predictable and most permanent qualities of trees. They are either straight or curved, vertical, horizontal or oblique. The trunk and main branches determine the line and mass of a tree, the shadow patterns both internally and externally and the character and personality of the tree.

Horizontal lines emphasize extent and are restful; vertical lines are severe and provide a feeling of height; oblique lines suggest movement.

Form is the mass or volume of a tree. The extremes of form, from rigidly erect to weeping, provide a wide palette of materials to choose from.

Columnar forms of trees have either rounded or pointed tops and provide contrast. Rounded forms usually have dense crowns. Vase-shaped forms branch high so there is usable ground space below, are compatible with most plant forms, and blend well with architecture. Pyramidal forms accent the spire top, provide strong contrast, are difficult to harmonize with other plants, but are effective as specimen plants. Irregular forms provide both interest and contrast to architectural masses because of variable outline. Weeping forms are unique, lead attention to the ground area, and are effective against hard lines of architecture.

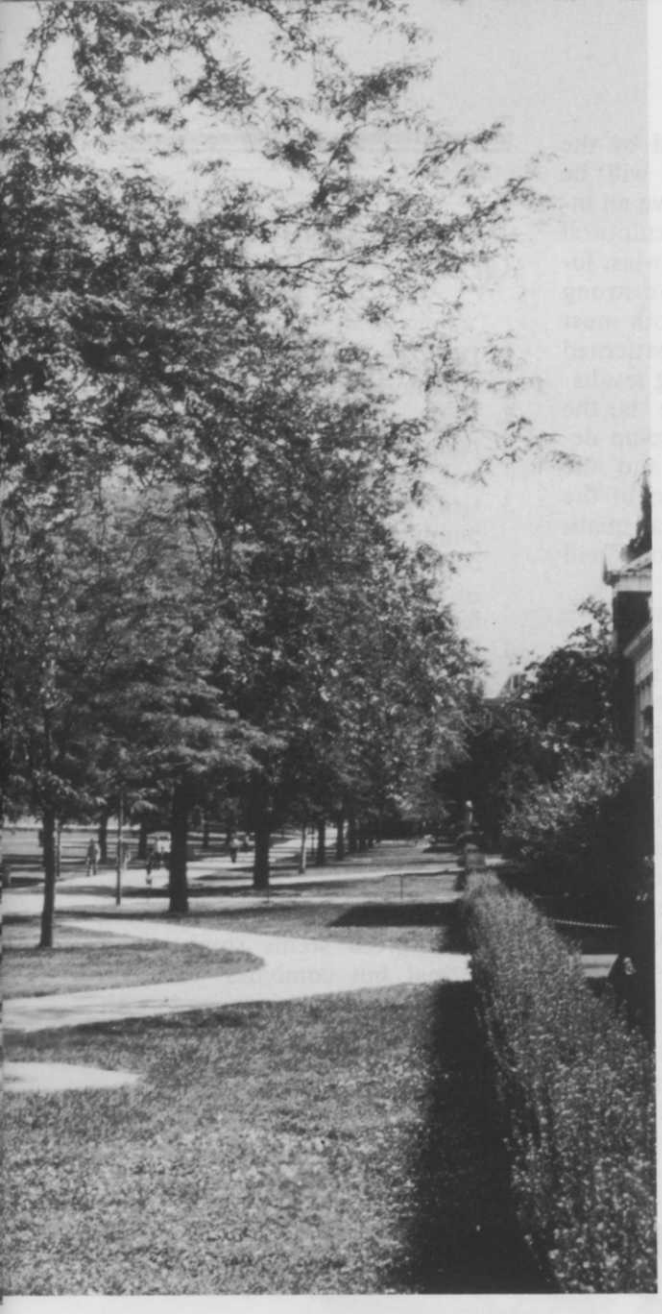
Color

Flowers, fruit, twigs, bark and foliage are the sources of color in trees. Because flower and fruit colors are seasonal and of short duration, they cannot be considered as primary design elements. Twig color becomes a major factor during winter months if deciduous materials are being used. But leaf color in both subtropical and temperate plant regions is an important consideration.

All colors in the landscape are subject to the variation between true local color and the color perceived as a result of atmospheric interferences between the light source (the sun) and the objects. For example, at sunrise and sunset, the sun turns to crimson, the sky to gold, and clouds to rose and lilac. This produces significant changes in color which are more difficult to grasp intuitively as compared to form, which is not subject to atmospheric variations.

Texture

The arrangement and character of the component visual qualities of trees result in a texture effect. Plant textures vary according to the distance from which the plant is viewed. In the near view, texture is the result of size and spacing of



leaves and twigs, shape and surface quality of leaves, and length and stiffness of petioles. In the far view, texture depends on the same qualities listed in the near view. However, as the individual detail is lost, texture results from the light and shadow of the plant or plant masses.

Texture can be divided into five classes: fine, medium-fine, medium, medium-coarse, and coarse. Fine textures are delicate and airy, provide a refined appearance, complement smooth surfaces, and soften and blend with harsh surfaces and lines of architectural masses. Coarse textures blend well with rugged, heavy materials, are dominant and effective even when viewed from a distance, but tend to dwarf areas.

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Esthetics

All other classes are gradational between these two extremes.

Design Context

The speed of the observer in motion becomes a critical factor in evaluating visual impact of the physical qualities. At a high rate of speed, form has the greatest impact, followed by line and color, and texture is the weakest. If the observer is walking at a rate of two or three miles per hour, the distances between the observer and the object will determine which of the three physical qualities will have the greatest impact.

In any design there are three compositional scales: near-view, middle-view and far-view.

The near-view space is that close to the viewer. Closeness allows the details of building materials and trees to be seen. At this scale, the intricate structure of line in twig and branching will produce a strong sculptural pattern in space and a three-dimensional filagree pattern against architectural structures. Form is important only when the total tree can be perceived by the viewer. Only small trees will be totally visible and must have an interesting silhouette and sculptural shape. The color of bark, twigs, foliage, flowers and fruit have strong impact, as does texture. Both must be carefully planned and patterned to avoid overuse and jarring results.

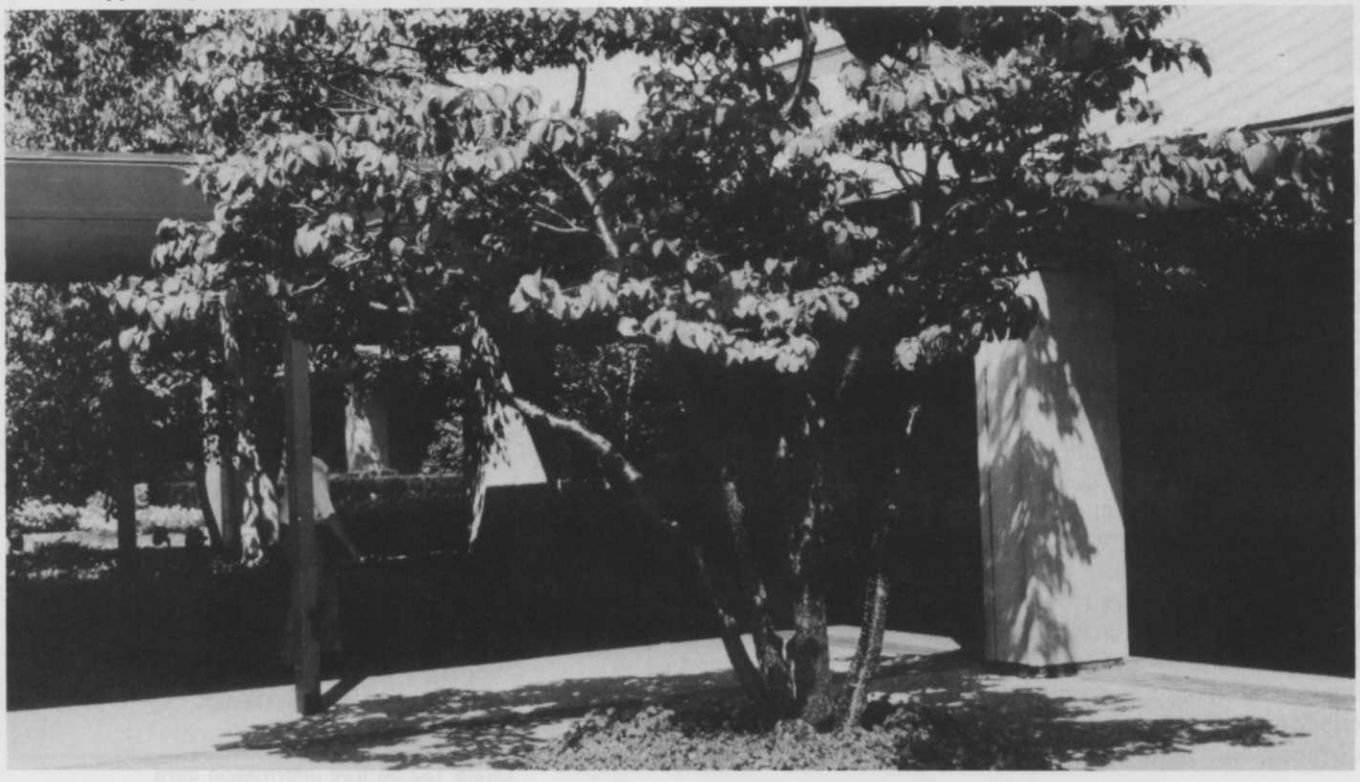
The middle-view scale is the transition between the close-up detailing of the near-view and the overall general composition of the far-view. All of the physical qualities come into play, but form will have greater strength.

Far-view is the basic structure and framework of the composition and is a greater distance from the viewer. Although it will already be structured by surrounding urban elements — buildings, roads, signs, walls, etc. — the trees should mold, define, and reinforce the volume of space contained within the composition. In this situation, line is evident only as a contour outline of the tree's form or as the result of several trees combined as a mass. Color has minimal impact except for the general impression of green without the subtle variations noted earlier. Texture, however, is somewhat more important because it is per-

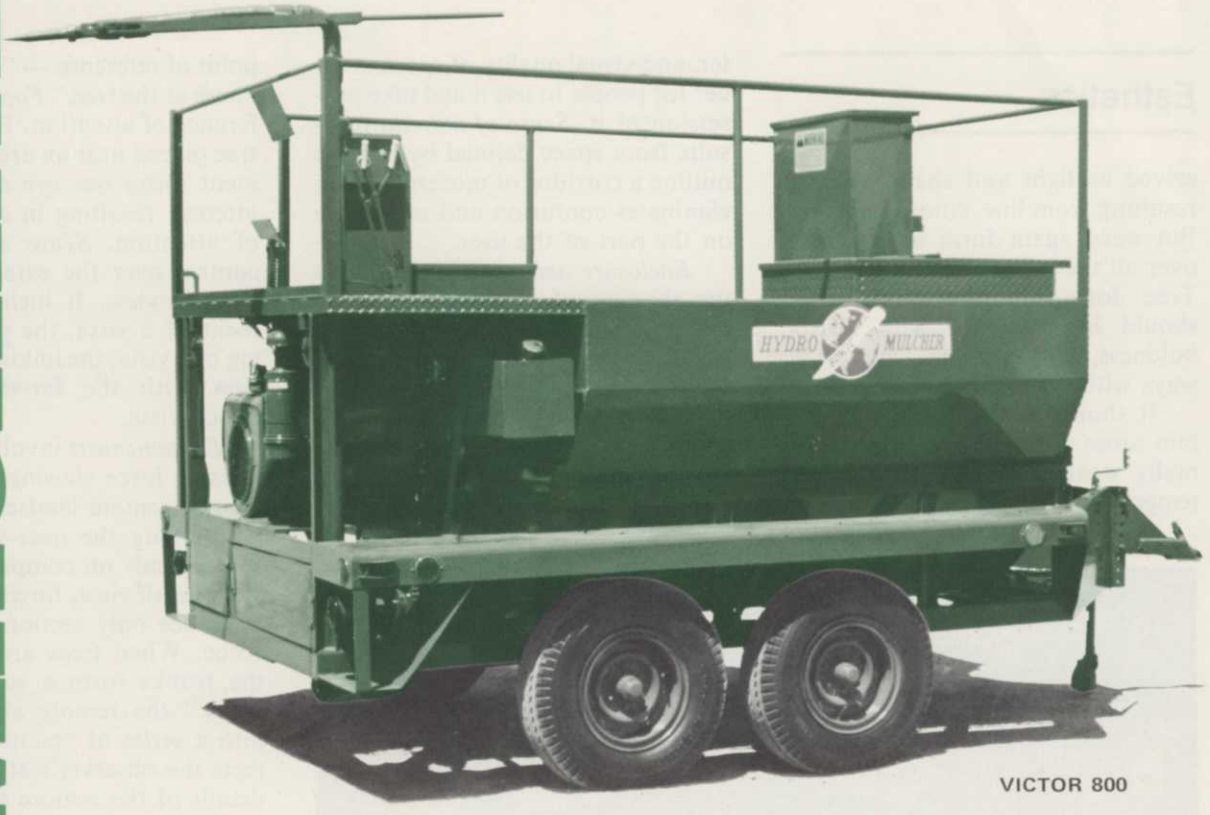
Varying shades of Green Foliage

1. **Dark green** appears somber but combines well with architecture.
2. **Light green** is effective in expanding apparent size of space and lightening low-light areas.
3. **Gray-green** is also effective in expanding apparent size of space, combines well with vivid colors of buildings but conveys a cold feeling.
4. **Blue-green** combines well with other foliage colors, suggests coolness and calmness.
5. **Red-green** offers a spark of vitality and feeling of warmth to an area but reduces its apparent size.
6. **Yellow-green** blends well with other colors, brightens shadowy areas and offers a cheerful effect.
7. **Black-green** seems somber and formal but combines well with other foliage colors and with architecture.

A silhouette can be dynamic and expressive as well as appealing and satisfying.



THE GREEN MACHINE



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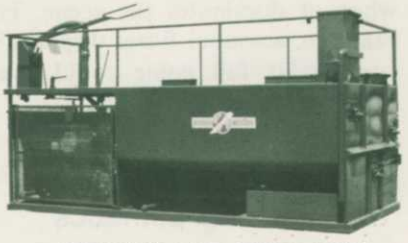

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ceived as light and shadow effects resulting from line, color, and form. But once again form asserts itself over all the other physical qualities. Tree forms in the background should be presented with clarity, boldness, and strength — and yet always with simplicity.

It should be noted that, at certain times of the day or year, a normally weaker element can assume temporary strength to the point where it dominates the scene. For example, seasonal floral displays or spectacular fall color could overpower from at any scale.

A tree can add drama to an otherwise ordinary scene.

Emotional Qualities Affecting Esthetics

Space identification results from trees being used to establish a feeling or sense of place, possession, and movement. *Sense of place* is an encounter between the individual and place that is dramatic, simple, and impressive — space in which a person is emotionally secure. *Sense of possession* involves shade, shelter, and visual quality of space in order for people to use it and take possession of it. *Sense of movement* results from space defined by trees to outline a corridor of movement that eliminates confusion and indecision on the part of the user.

Enclosure and space definition is the shaping of outdoor spaces by utilizing trees. Enclosures created by trees are rarely total and complete. Trees function more on the basis of suggestion rather than by providing complete visual stops. In the near-view, tree trunks provide a colonnade that defines space and implies containment, yet the gaps between trunks reveal what is beyond. In the far view the combination of trunks and foliage tend to merge, suggesting a total and complete enclosure.

The details of line and form, color, and texture of the trees used for enclosure have importance at a distance of 40 feet or less. Beyond 40 feet the composite effect of the total mass assumes importance.

Orientation, focus, and sense of direction are attributes of visual control through the use of trees. *Orientation* is the use of trees to stimulate a reaction such as "I am enclosed" or "I am exposed." Trees are also obvious devices to serve as a point of reference — "over there" or "here at the tree." *Focus* is the transferance of attention. For example, a tree placed near an architectural element seizes our eye and holds our interest, resulting in a strong focus of attention. *Sense of direction* is control over the extent of the observer's view. It includes enframement of a vista, the partial screening of a vista, the linking of the near-view with the far-view, and the closed vista.

Enframement involves the use of trees to force viewing a special feature or remote landscape.

Linking the near-view with the far depends on compartmentalizing the overall view, forcing the observer to see only sections of the total scene. When trees are arranged so the trunks form a series of "windows," the remote area is framed into a series of "pictures." This directs the observer's attention to the details of the remote scene.

Partial screening of a feature or vista utilizes the crown of a tree to withhold the total view until the observer has moved past the tree. This technique works well when the feature is large enough to be partially viewed over or around the screening tree. This introduces intrigue and curiosity that is climaxed by the dramatic impact of the full-view once one has passed the tree.

Finally, a blocked vista limits the observer's view to the immediate space he presently occupies. The result is added interest in the immediate environment.

Trees selected for screening or blocking of vistas should have strong form and be relatively dense. At the same time they should have interesting details for the nearby observer.

Truncation is the use of trees to mask the upper portion of buildings so that the building is not seen in its entirety. This break of the vertical mass directs attention to the space at eye level (the area below the tree's crown). The immediate space is no longer overwhelming to a person because the dwarfing influence of architecture is reduced by truncation.

The dramatic involves incidence, sequence, anticipation, infinity, and illusion. Establishing an

Continued on page 34

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You can have simple, less expensive turf care with the right equipment. Cushman Turf has developed an easy system so you can save as much as 35% in equipment investment. And you save time with built-in job flexibility.

The 3- and 4-wheel Turf-Trucksters, 8 jobs with one basic power unit.

The rugged 18-hp Cushman Turf-Truckster Chassis (available in 3- and 4-wheel chassis models) serves all your turf needs. Use the Turf-Truckster to transport, tow or drag. Add the Power-Take-Off unit (PTO) to spray, top dress, aerate or spread. Add the hydraulic system to dump, spike or quick aerate. Raise or lower accessories quickly and easily, with the flick of a lever.

The 4-cycle air-cooled OMC engine and variable speed transmission are built to tackle turf-type situations. The rugged Turf-Truckster engine is built of die-cast aluminum for lightweight strength. The standard auxiliary transmission gives 6 forward and 2 reverse speeds. And a fast acting governor means less down shifting.

Wheel-type steering and a disc-type parking brake are standard equipment on the Turf-Truckster. Easy handling is built-in with a 17-foot turning circle on the 3-wheel model and 23-foot turning circle on the 4-wheel.

When you need professional turf-care equipment, you'll find it's always "Greens-Up" with a Cushman Turf-Truckster. And you'll be time and money ahead.

CUSHMAN
TURF-CARE
EQUIPMENT

The Turf-Truckster powers the total

PULL PINS

The pull pin advantage of the 18-hp Cushman Turf-Truckster means fast on-off movement of all attachments; it's the secret of the Cushman Turf-Care System's versatility.

QUICK AERATOR

The Cushman Quick Aerator is designed to slice greens and aerate fast during the hot, dry periods when air and water penetration is critical.

Just attach the Quick Aerator to the Turf-Truckster with three pull pins. The hydraulic system and dump kit on the Turf-Truckster allow you to lift and lower the Quick Aerator on the go from your seat. So movement from green to green is simple and fast.

Three types of tines are available: slicing, coring (two sizes) and open spoon. The tines aerate every 6 inches to provide adequate slicing and soil removal.

SHORT DUMP BOX & FLATBED/BOX

The short box or the flatbed/box are mounted quickly by positioning either on the chassis and inserting two pull pins. Bolt-on sides and tailgate make the flatbed into a dump box. And either box is capable of hauling up to 1,000 lb. payloads.* A manual hydraulic dumping system is available, and dumps either box with a pump-action handle at the side of the vehicle. The Turf-Trucksters can be equipped with powered hydraulic dumping. Just add the PTO and hydraulic packages and you can dump hydraulically without leaving your seat. Just push a lever.

*Rating for vehicle equipped with 9.50-8 rear tires.

SPIKERS

Attach the Cushman Quick Spiker to a Turf-Truckster equipped with PTO, hydraulic system and dump kit with just three pull pins. Spike a 57-inch swath, even over undulating greens, with the two precise spiking gangs. Nothing to tow. Nothing to load or unload. Spike 18 greens in less than 2½ hours.

Attach the Cushman Trailing-Type Wheeled Spiker and you'll get the same results as with the Quick Spiker, except the Trailing-Type Spiker is controlled by a pull rope to raise and lower while operating.

Cushman Turf-Care System.

SPRAYER

The PTO package with extension shaft makes the 18-hp Turf-Truckster ready to spray greens the easy accurate way.

The Turf-Truckster transmission and built-in variable speed governor assure a uniform ground speed, even over varying terrain. And an accurate metered spray means proper application and less chemical waste.

The complete optional spray package includes: 100-gallon capacity tank, high-flow nylon strainer, jet agitator for mixing, high-pressure handgun (which sprays up to 40 feet), rear sprayer boom, centrifugal pumping system for boom or handgun spraying.

TOP DRESSER

The chassis-mounted top dresser, driven by the PTO of the Turf-Truckster, eliminates the need for self-powered units and time-consuming walking.

The moving bed and rotating brush operate at a controlled speed to break up top-dressing materials and direct them downward in a 31½-inch swath. The engine/ground speed governor keeps your spreading rate constant.

SPREADER/SEEDER

The Cushman Cyclone Spreader/Seeder can be rear mounted on either the 3- or 4-wheel 18-hp Cushman Turf-Truckster, and it's controlled by the Cushman PTO extension unit. Depending on the material, this spreader can broadcast over an area up to 40 feet wide.

In addition, the Cyclone Spreader/Seeder mounts on either the short box or flatbed/box and the driver controls all operation from his seat.

GREENSAVER (DRUM AERATOR)

The Cushman Greensaver™ is the efficient low-cost way to aerate greens and tees, fast and deep. Attach the Greensaver to your Turf-Truckster (equipped with a hydraulic system and dump kit) with 3 quick-release pull pins.

Add weight trays and sand to the Greensaver attachment and you're ready to aerate up to 10 times faster than walk-type units.

The Greensaver collects the cores while you aerate and you can move quickly from green to green by lifting the Greensaver hydraulically.

Get a free demonstration of the complete Cushman Turf-Care System from your Cushman dealer. Or write direct for complete information.

CUSHMAN
TURF-CARE
EQUIPMENT

P.O. Box 82409
Lincoln, Nebraska 68501

THE NEW TURF-TRUCKSTER RUNABOUT IS BUILT FOR ECONOMY AND VERSATILITY IN 1978.

The new Radial Frame® makes this Cushman Runabout the most useful vehicle on your grounds. Welded tubular steel surrounds the vehicle, and a new suspension system adds greatly to operator comfort. In addition to strength and durability, the new design increases serviceability, giving you day-after-day, worry-free use of your Runabout.

Your choice of two power plants is available: the proven 18-hp OMC die-cast aluminum engine or the 12-hp air-cooled four-cycle engine. Both are stingy on fuel. And bolt-on sides with a tailgate come as standard equipment on either Runabout.

A Cushman Runabout can stretch your manpower while saving precious time all around your turf areas. Runabouts are used for general golf course and grounds transportation, hauling tools, fertilizer or equipment, and moving maintenance personnel.

So see the dependable new Cushman Runabouts at your nearest Cushman-Turf Dealer. They're ready to go to work for you.

CUSHMAN®
TURF-CARE EQUIPMENT

A Division of Outboard Marine Corporation
3310 Cushman Drive, P.O. Box 82409
Lincoln, NB 68501
Makers of Johnson®, Evinrude®, and Ryan®

77-CUT-4

Printed in U.S.A.

Make the fifth season your "Thrift Season" for tree service.

The fifth season is "Davey Season." It starts right now, as your trees are dropping their leaves. It lasts until the first spring buds appear. And it's the low-cost season for you to call Davey for a tree service survey.

We can make surveys and cost estimates — without obligation. We can help you plan your tree maintenance budget through the early months of 1978. Or, with civic and recreation areas less crowded and the busy summer over, we can give prompt attention to the immediate needs of valuable trees.

For work you need done immediately, our trained crews are ready with specialized equipment to plant new trees and remove dangerous old ones, to prune deadwood and large hazardous limbs from pedestrian paths, and grind down stumps to below ground level.

So make the fifth season your thrift season. Preserve the beauty and value of the trees in your care, and ensure public safety at an economical cost now. And avoid costly emergency work and overtime in the future.

Call your local Davey representative for help in organizing and budgeting your tree-service needs. He's in the Yellow Pages under Tree Service.

For landscaping needs, send for new catalog listing over 150 varieties of shade and ornamental trees, ranging from 2" to 10" in caliper.

DAVEY TREE
KENT, OHIO 44240
Coast to Coast and Canada

Circle 118 on free information card

incidence involves the capturing of the eye and attention in the midst of a monotonous field of vision. A continuous row of buildings quickly becomes boring because of number and dominance. If such a scene is interrupted by a tree or group of trees, the total scene has interest for the viewer.

Sequence is a process of revealing a succession of views by having trees arranged to suggest a path of visual or physical movement. *Anticipation* is the exploitation of human inquisitiveness. Instead of giving orientation and meaning to the scene, trees are used to arouse one's curiosity as to what will be seen next after passing beyond the visual block. An attempt to use trees to expand the boundary of the immediate area provides a *sense of infinity*. Trees with strong line and form can direct the eye and attention, suggesting an expansion of size and infinity. *Illusion* involves suggestion and contradiction of perception.

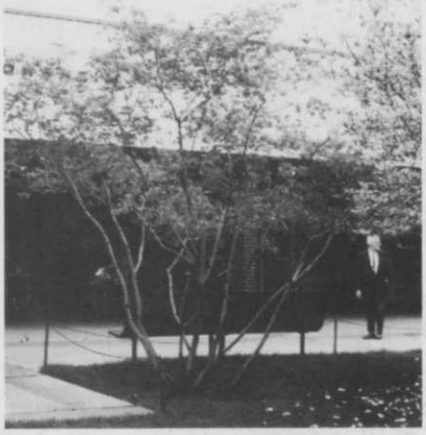
Past experience has taught us what we expect to perceive in depth, size, and distance; but by skillful placement or juxtaposition of trees,

Continued on page 40

A combination of shadow and reflection brings this pool to life.

Additional Characteristics Affecting Esthetics

1. **Silhouette** — View of a tree as seen against the sky or building. It is a quality that is dynamic and expressive as well as appealing and satisfying.
2. **Sculptural quality** — Refers to the three-dimensional form of the tree. It may be bold or varied, yet always interesting because of the changing visual angle that results from the movement of the observer.
3. **Shadows** — Two-dimensional elements that have tremendous potential for esthetic effects. Shadows on the vertical walls of architectural or paved surfaces of the ground add detail, contrast, and animation to the man-made surfaces.
4. **Reflections** — Two-dimensional patterns, like shadows, but created by water, glass, and other mirror-like surfaces. Surfaces that upon quick glance have no significance come to life with the interesting and provocative pattern of shadow and reflection.
5. **Intricacy** — A quality relating to the natural yet sometimes curious branching pattern and general habit of growth of the tree. For the observer, this quality is sometimes curious and abstract, yet impressive and meaningful.
6. **Geometry** — The interaction of the tree form with architecture, sky, and space. Geometry can transform the landscape by the scale it establishes and by the significance it gains from contrast with the surrounding environment.



This tree results in a strong focus of attention.

Shadows on man-made surfaces add detail, contrast and animation.

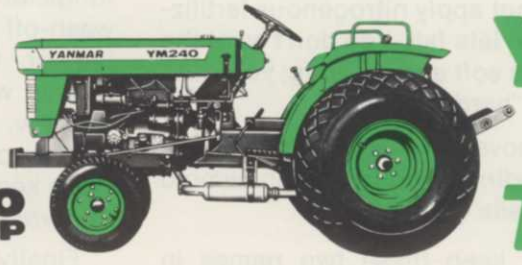
We're making less size (and money) do a lot more work.

Many diesel tractors have capacity they never use. And a size that can get in its own way. Not Yanmar, though. Each compact Yanmar diesel tractor has enough flat-torque power for all groundkeeping activities, but never more than you can use. Because more than enough is more than you can afford.

Yanmar gives you standard 2-speed PTO, 3-point rear hitch and the ability to precisely accommodate over 100 optional tools and implements. Four-wheel drive is available. You can even transport one in a light truck.

Our diesel engines are specially designed for tractor use. To run with absolute dependability year after year. With minimum maintenance care. And much less overall expense.

Big performance in a small, highly mobile package. From the people who pioneered the world's first compact diesel.



YM240
24HP

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DIESEL
TRACTOR

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YANMAR DIESEL ENGINE CO.,LTD.

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At last, Snowmolds efficient, money-

Learn how today's fungicide treatments can be far more effective, longer-lasting and cost-efficient with Exhalt in the spray. Here's the story:

In the turf community, Snowmold control has been like the weather: the subject of much talk and wishful thinking, but little improvement. Until now . . .

Now, there's a whole new approach:

Despite the name, Snowmolds don't need snow to attack turfgrasses. All they need to damage turf is a combination of moisture and temperature . . . in deadly proportions.

The kinds of Snowmold

Pink Snowmold (Fusarium nivale or Fusarium patch) can attack in both northern and southern regions, but is more damaging in the south. It doesn't need snow. It attacks turfgrasses anytime — late fall, winter or early spring — because fungus spores always exist with plant life. All they need to become active are ideal conditions, such as excessive moisture and cool temperatures.

Gray Snowmold (Typhula itoana), sometimes called Typhula blight, snow scald, or winter scorch, likewise is a problem in both north and south, but is a particular problem in the north. While this fungus develops fastest under a snow blanket, snow is not essential. The disease appears after the first thaw.

Whatever the disease variety, the significant point concerns their control, a kind of breakthrough in strategy for handling them.

That's not to say we have a simple cure for complex problems. After all, Snowmolds differ in kind and severity. They vary with weather conditions. And each needs a treatment tailored to the particular situation. But there's one universal constant:

The TIMING of the treatment is all-important!

You know "when" because you know your problem, your weather . . . we don't.

But, we can offer some guidelines, some cultural practices every bit as important as the fungicide itself:

1) Do not apply nitrogenous fertilizers in late fall. You don't want the grass soft and growing; you want it to "harden off".

2) Remove all thatch; it's a fertile breeding ground for Snowmold mycelia.

3) And keep these two names in your vocabulary: Exhalt800, Gordon's Sticker-Extender; and Exhalt4-10, our Anti-Transpirant. These are the additives to your Snowmold and winter program that make all the difference. Here's why:

Exhalt800 extends fungicide life as much as two or three times.

And **Exhalt4-10** sets up a barrier against water loss from the plant.

Snowmold in the north

Where the ground freezes, apply fungicide in combination with Exhalt800 after the grass stops growing, normally after the first hard frost. This will encapsulate the fungicide on grass blades, resist wash-off and weathering, can double or triple the fungicide life. Should warm days cause the grass to grow, Exhalt800 can stretch and flex to permit this growth, meanwhile keeping the fungicide in place and working.

Finally, when you're sure grass is no longer growing, apply Exhalt 4-10. This protective shield coats the grass and fungicide to greatly reduce the chance of fungicide and moisture loss.

are yielding to saving new controls

Snowmold and Winterkill in the south

Here, the problem is more difficult, because grass may grow all winter. Depending on the severity of the disease, your turf may need from one to three or four fungicide applications, starting in late November and ending in April. In any case, combine the fungicide with Exhalt 800.

If it gets cold enough to stop grass growth, apply Exhalt4-10 . . . the "raincoat" that protects the grass blades and reduces the chance of winter damage.

If the ground freezes, apply Exhalt4-10 at once. The reason: warm days may start growth and, because the grass can't get essential moisture from frozen soil, it may die, or "winterkill". But the coat of Exhalt4-10 cuts the transpiration rate almost in half, conserves precious moisture and helps the grass survive.

Winterkill also endangers shrubs, particularly conifers that keep their leaves in winter. Like turf, they can be protected with a coat of Exhalt 4-10 when the ground freezes.

Efficiency and economy in any climate

The message is clear: Now you have available two tested-and-proved additives for efficient control, no matter where the disease or what its nature.

The cost is small. Considering that Exhalt800 may double the life of expensive fungicide, the cost is low (add only 1 pint to 100 gallons of spray). It protects fungicide without inhibiting grass growth, is not harmful when used as directed.

To further reduce the chance of winterkill, apply Exhalt4-10 as needed.

In maintaining healthy turf, you can't avoid the high cost of fungicides, but you can double their useful life and halve the cost by using Exhalt800. You'll save three ways: on materials, on spraying labor, on the cost of repairing damaged turf.

When is the time to start?

Now, while the facts are fresh in your mind, is the time to make your plans, see your distributor and order supplies.

Your Gordon distributor stocks everything you'll need to start your Snowmold and winter program this fall. Shouldn't the next move be yours?

For information and prices, see your local authorized distributor listed on the following pages.

GORDON'S

PROFESSIONAL TURF PRODUCTS

pbi/gordon corporation

300 SOUTH THIRD STREET
KANSAS CITY, KANSAS 66118
913-342-8780

Massive evidence favors end-of-season weed control with TRIMEC® herbicide

Innovative turfmen cite at least four advantages of spraying weeds and dandelions late in the fall. Do you know what they are?

For years, the weed problems of other turf professionals have been much like yours — frustrating and consistent. Each year, in February or March, your beautiful turf turns yellow with those ugly, embarrassing, time-wasting dandelions.

Every spring, year after year, it happens. You've got to drop the hundred urgent tasks at hand . . . and spray those dandelions. It's cool, windy, maybe muddy . . . certainly not a good time to spray, even if you could spare the time. But that isn't the worst of it . . .

In another month or six weeks, here comes the second wave: Plantain, sorrel, chickweed, thistle, miscellany . . . and more dandelions! All demanding a second spray because they were not actively growing during your first treatment. And this dismal performance has gone on . . . year after troublesome year.

But times have changed

Sure, you've known you should kill the late fall dandelions before winter, but you couldn't. Herbicides weren't much good in the cool of late fall. Most still aren't. But TRIMEC is. It's still potent at season's end . . . as late as early December in some climates. And that's the basis of the burgeoning improvement in weed and dandelion control. It can work for you.

Your life can change

Now you can do what you've always wanted to do. Spray TRIMEC to kill dandelions in the fall. Late fall. Probably between mid-October and late November. When you do, something funny will happen on your way to spray dandelions early next spring. You won't have to. Because you won't have dandelions. Nor chickweed, plantains and suchlike. Except for stragglers, they're dead. Consider the meaning:

Your time is yours

You won't have to apply TRIMEC until late in spring. Immediately, you've gained a month or six weeks of work-time when you need it most. Time to plan . . . schedule improvements . . . train new people . . . go fishing.

Of course, you'll need another TRIMEC weed treatment again in late fall. After a touch-up in late summer. Two complete sprays are adequate: one in late spring . . . another in late fall (and only a touch-up between them). And you'll have controlled most of the weeds destined to sprout for that year.

Count the benefits

(1) Early Spring: Turf clean, virtually free of dandelions and other broadleaf weeds. More time for other work. You save labor and labor costs.

AUTHORIZED DISTRIBUTORS
GORDON PROFESSIONAL TURF PRODUCTS

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Palmer • Alamasu, Inc.

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• Tieco, Inc.
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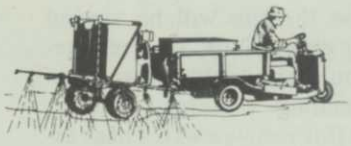

Why TRIMEC is today's No. 1 broadleaf herbicide

Bentgrass formula also available

- **Controls the widest range of broadleaf weeds**
- **Gets hard-to-kill species with one treatment**
- **Wide safety margin for lawn grasses, ornamentals**
- **Minimum hazard from root absorptioon**
- **No vapor action after application**
- **Effective weed control in wide temperature range**
- **Unique formula overcomes water hardness problems**
- **Treated areas may be seeded within two weeks**
- **Non-flammable and non-corrosive in use**
- **Product stable several years above 32° F.**
- **Biodegradeable: friendly to the environment**

(2) **Late summer:** Touch-up only, in problem areas. You can do it quickly.

(3) **Late fall:** A full TRIMEC weed spray encounters less rain, mud and wind than in early spring. Ornamentals, going dormant, are less prone to "drift" damage than in spring when buds and foliage are young and tender. Mowing is finished, reseeding done, providing more spraying time and minimizing labor costs. New grass is mature enough to resist damage from a late spray.

(4) **All Seasons:** Far better time management lets you plan and schedule work, levels out peak workloads, vastly improves your overall efficiency.

Trimec for all seasons

The foregoing scenario is within your grasp today because TRIMEC is different. Unique. A patented formulation of 2,4-D, dicamba and MCPP . . . a synergistic mix that continues to work powerfully in late fall temperatures . . . at 50° or cooler. It's revolutionizing weed-control customs all over the U.S. And it can do the same for you.

Overwhelming evidence

You needn't take our word, because TRIMEC'S effectiveness at season's end is well established by experience. Here are the recent comments of a golf course superintendent:

"TRIMEC worked so well for us toward the end of '75 that we used it again last fall during the Thanksgiving week. This spring, our course was practically weed-free except for a few stragglers, and we didn't need another weed spray until late spring. TRIMEC certainly is the best herbicide I've ever used for broadleaf weeds. I'm convinced that late fall is an ideal time for its use. For one thing, ornamentals are tending to go dormant and are less vulnerable to 'drift' damage."

Mickey McGuire, *Superintendent*
Chapel Woods Golf Club
Lee's Summit, Missouri

Shouldn't you try it?

Why wait another day? Order TRIMEC now, put it down this fall, see the difference next spring, and all year round. At the very least, designate a test acreage . . . treat it, watch it, compare it with what you've done before.

Your TRIMEC dealer stocks both TRIMEC and TRIMEC Bentgrass formula. He'll be pleased to help you get started.

For information and prices see your local authorized TRIMEC distributor

TRIMEC® is a registered trademark of PBI/GORDON Corporation U.S. Patent No. 3,284,186

GORDON'S

PROFESSIONAL TURF PRODUCTS

pbi/gordon corporation

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913-342-8780

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the visual experience can contradict the intellectual. If carefully handled, it can be intriguing and delightful.

Use of Trees for Esthetics and Utility

Trees for Different Urban Settings

The typical urban situations in which trees should be included can be grouped into (1) the single site, (2) the project site, (3) open space areas and (4) the connector system.

The *single site* usually involves a small unit of land on which there is one building with limited open space, such as a plaza. The size of the tree must be large enough to have a good scale relationship with the building. If it is a high-rise structure, the tree's crown should be massive and large enough to truncate the towering architecture so that the building will be viewed as a backdrop for foliage and branches.

Because the site will be viewed mostly by pedestrians, the trees selected should contribute interest in line, branching patterns, texture, and color (for near-views). These esthetic qualities provide delightful contrasts to the hard surfaces, harsh lines and cold materials of the architecture.

The *project site* usually includes more than one building and has sidewalks, streets and parking areas. The trees should facilitate visual identification, create a memorable scene and establish the feeling of a sense of place.

Often this landscape is characterized by an openness between buildings, roads and walks. Trees can be used to provide continuity to space and to articulate the form of space simply by dividing it into smaller units. As trees will be viewed mostly as background, their forms will be a critical esthetic factor. Similarly, parking lots are large and incomprehensible. They can be given architectural form through the repeated use of tree forms that are visually strong. An added functional benefit will be to give order and pattern to the movement and parking of cars in the lot.

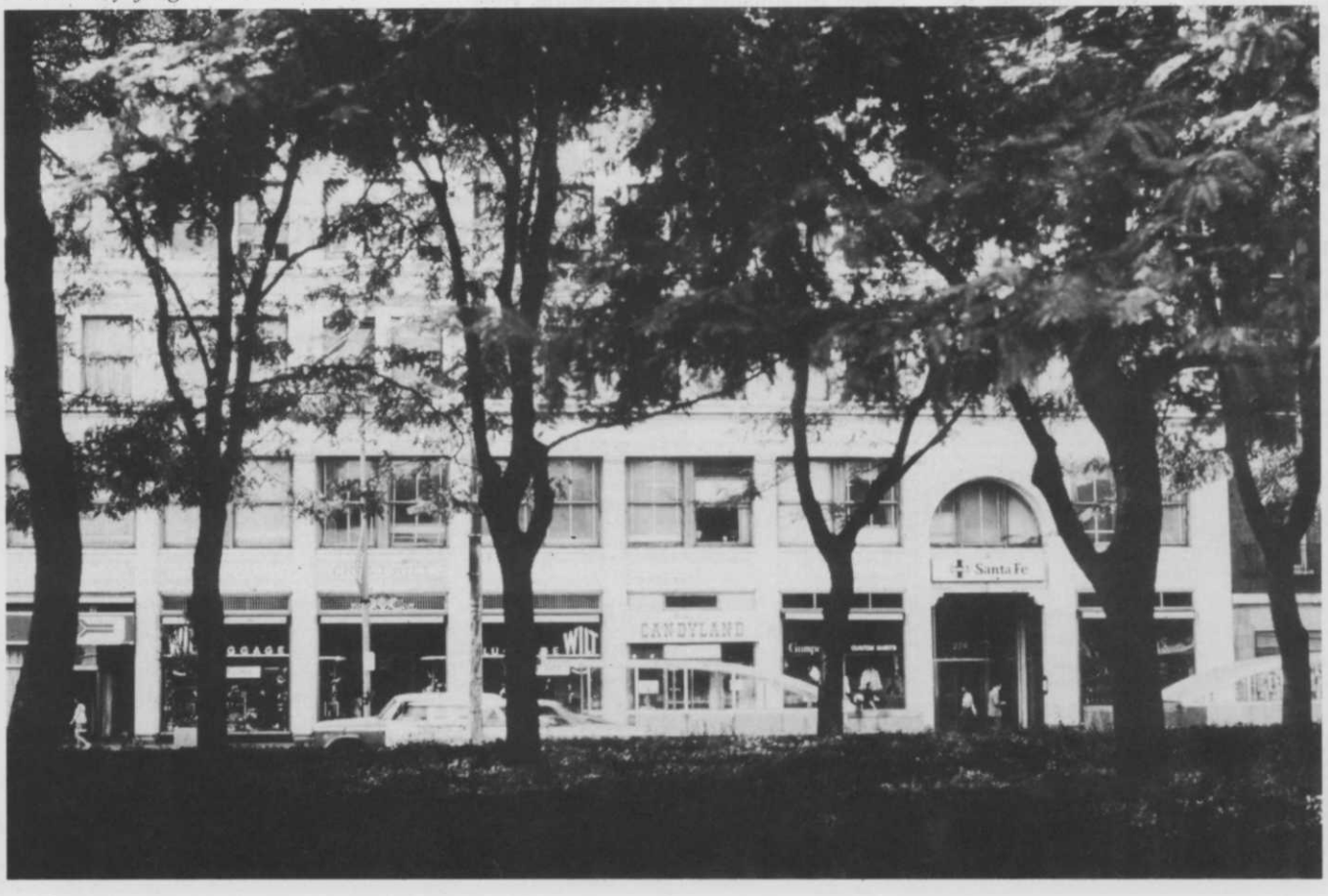
Trees may also be used to direct the movement of people. When the direction of movement is defined, the user can have a fuller enjoyment of space and be relieved of confusion and indecision.

Open spaces are varied and serve different needs and functions. Open space may be a greenbelt for separating or blending different parts of the city. It may be open lands for active and passive recreation. Or it may be a large-scale plaza for a variety of mixed uses such as sitting, walking, playing, eating, concerts and art shows.

Greenbelts can be used as a transition or buffer between various districts — as commercial, residential, industrial, recreational and educational. Trees can be used as either barriers or elements of transition, depending on the degree of physical and visual penetration they permit. The individual tree's form, color or texture is not important, but those of the aggregate are. The composition must be carefully con-

Continued on page 42

Trees can unify an awkwardly fragmented scene.



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Esthetics

ceived to convey a harmonious and visually satisfying combination of the physical qualities.

The connector system involves trees that extend throughout the city, connecting many diverse elements. The connector system is potentially the unifying element of an urban scene that is awkwardly fragmented into separate uses and zones. Esthetic qualities of trees provide one of the most powerful agents for unifying and joining the city.

The criteria for tree selection will be based upon the character of the street — residential, arterial, strip-commercial and pedestrian-shopping.

Trees on a residential street should mask utilities without interference, separate pedestrians from automobiles and soften and blend varying architectural styles into a harmonious whole.

For arterial streets, in general, selection of trees should consider speeds of the observers. The importance of form is obvious. Whether the crown should be open or dense depends on how much visual penetration is desired beyond the street corridor. Trees do not have to be regularly spaced at 30 to 40 feet to be effective. In fact, utilities, curb cuts and other physical elements usually prevent such rhythmic repetition.

Nevertheless, the introduction of trees wherever space is available creates visually pleasing effects along a monotonous street. Such trees should be sharp in silhouette feature, strong in texture, line, and possibly color, so as to add variety and interest.

Varying the street-tree pattern by alternating trees in a projection-and-recession pattern eliminates the effects of a straight-line green facade imposed on straight-line architectural facades. This provides an intricacy and pattern that is stimulating and enjoyable. Form and habit of growth are primary considerations.

Trees for minor streets should be used in much the same way as for arterial streets. However, on narrow streets, trees may be limited to one side, alternating sides by blocks. For narrow streets and small buildings, relatively small trees are preferred.

Trees of high interest in details would be appropriate on a pedestrian shopping street. At the same time they should function to separate cars from pedestrians, provide human scale in the midst of oversized buildings, serve as focal points, vistas and places to sit, and harmonize variable styles of architecture or a diverse and unorganized scene. □

William R. Nelson, Jr. is a professor and extension landscape architect in the Departments of Horticulture and Landscape Architecture at the University of Illinois, Urbana, Illinois.

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Disease Stresses *Continued from page 21*

ban situations simply because no one wants to destroy an ornamental plant until it is practically dead. If, however, more thought were given to planting, crabapples and hawthorns would be located at greater distances from susceptible junipers and a reduction in the amount of infection on all hosts would be realized. The judicial use of rust-resistant varieties of crabapples and junipers would help to eliminate the problem.

Chemotherapy is a control method that may be used as an eradicant or a protectant. Various procedures have been used in testing chemicals that inhibit development of a pathogenic agent within a tree. Those procedures that have shown the greatest promise for internal therapy involve either soil injection or direct injection of chemicals into the vascular system. Although entomologists have recommended several systemic chemicals to control insect pests, plant pathologists have only a few compounds that may be effective chemotherapeutants. There have been many disappointments in the research work with chemotherapeutants, particularly in the systemic control of vascular diseases such as Dutch elm disease, oak wilt, and Verticillium wilt. Research plant pathologists currently working on chemotherapy are still optimistic that compounds such as the solubilized forms of benomyl and TBZ (thiabendazole) may prove to be effective chemotherapeutants, particularly for Dutch elm disease control.

Protection

Fungicide and bactericide sprays often must be used to prevent ornamental loss of leaves and fruit. Complete control of a leaf disease by protective fungicides is seldom achieved, especially during those years when disease incidence is severe. Improper timing of spray application, use of the wrong fungicide, and excessive rain often result in failure to control many tree diseases effectively. Even with the limitations of time and knowledge, spray control should be used if the climatic conditions may be optimum for severe infection and heavy defoliation early in the growing season. I discourage the use of more than two applications of a protective spray, because the limited amount of added protection usually does not justify the added cost of labor and chemical.

Tree Selection and Future Maintenance

Urban tree selection has changed considerably during the past 30 to 50 years. Elm, pin oak, London plane, American sycamore, and Norway maple were formerly the most common species selected. All were relatively easy to transplant and grow and, therefore represent

Continued on page 46

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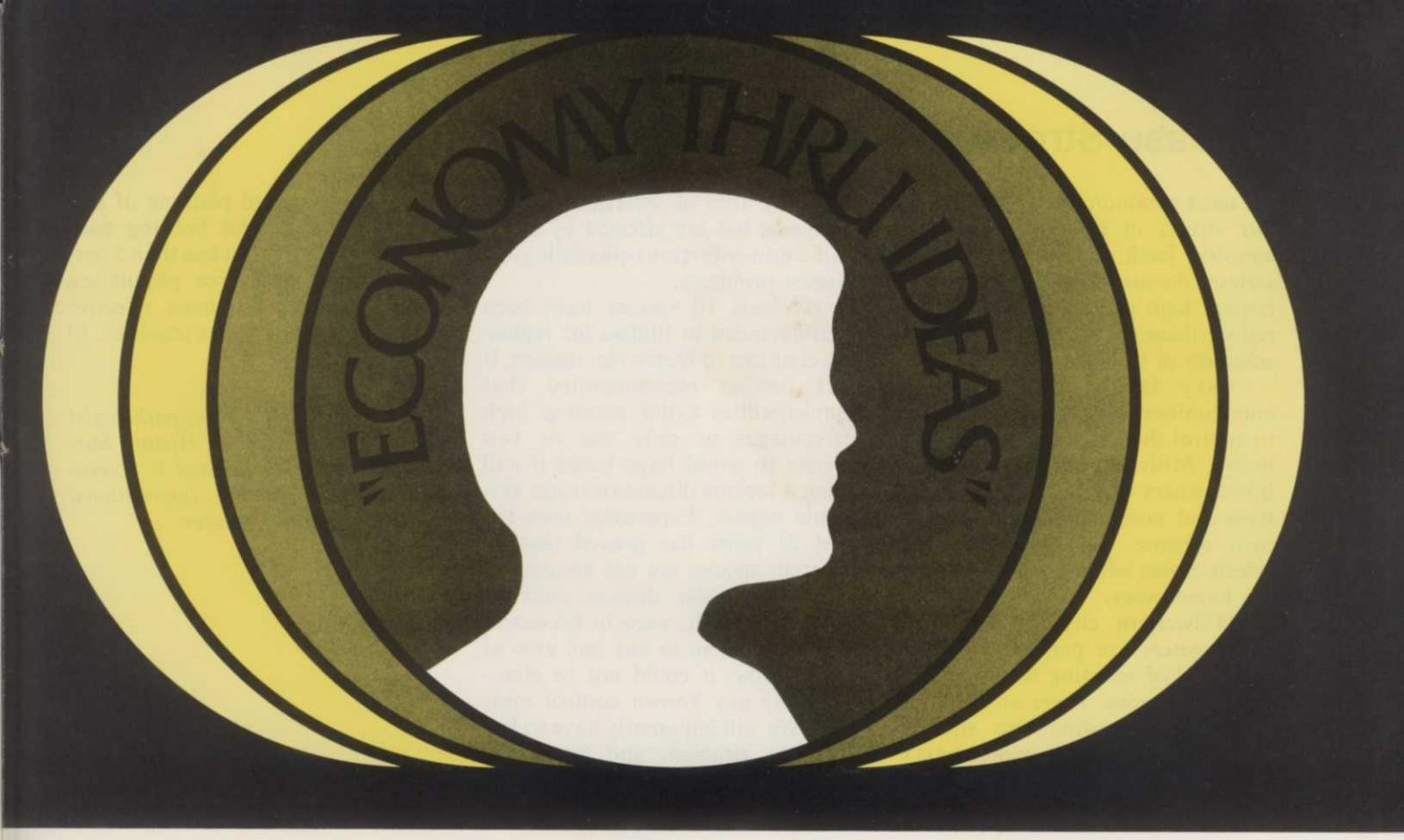

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Disease Stresses *Continued from page 44*

the most common tree species lining our streets in many parts of the country. Each of these species has serious disease problems that now require high maintenance costs. To reduce these costs, a more scientific selection of tree species is needed.

Very few of the smaller communities have a tree ordinance to control shadetree replacement. In many Midwestern communities, homeowners have replanted street trees and maintained them at their own expense. Unfortunately, tree selection was left to the discretion of the homeowner.

Midwestern city arborists and homeowners are perplexed by the problems of selecting maintenance-free tree species. There are, in fact, no maintenance-free tree species; but some require less maintenance than others. Many tree species are relatively free of infectious-disease problems but are affected by insect and non-infectious-physiological disease problems.

At least 10 species have been recommended in Illinois for replacing elms lost to Dutch elm disease. It was further recommended that municipalities avoid planting high percentages of only one or two species to avoid large losses if and when a serious disease or insect epidemic occurs. Experience over the past 25 years has proved that 10 different species are not enough.

If a vascular disease, such as Verticillium wilt, were to become a serious problem in any one area of the country, it could not be eliminated by any known control measure. We will apparently have to live with the problem and hope that future resistant varieties are developed. Randomized planting of susceptible species and limiting each susceptible species to less than 5 percent of the total tree population should provide the most effective means of limiting future tree loss. □

E. B. Himelick is a plant pathologist for the Illinois Natural History Survey, Urbana, Illinois, and is Executive Director of the International Society of Arboriculturee.

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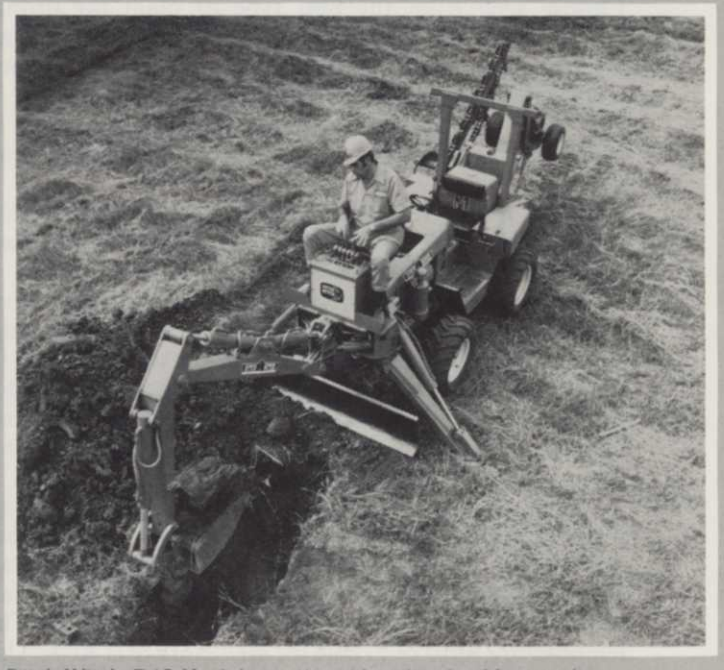

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Propagation of Ornamentals From Seed

Propagation from seed can be an easy and economical means of increasing your inventory of ornamental plantings. There are some advantages and disadvantages, according to the Florida Nurserymen and Growers Association.

Almost anyone has the necessary containers for planting and a small spot in which to grow them. The seed can be collected easily from trees and shrubs in any accessible place. Fresh seeds are easy to germinate, but variations may occur in seed-produced plants. However, many plants can be grown and only the best retained.

The disadvantages of seed propagation are: extreme variation in some species, hard seed coats that must be scarified before planting, variable growth habits, progeny not true to type and low viability.

Collecting seed should be done with great care. Choose seed from the best type of plant for propagation and check for maturity. Many seeds have an after-ripening period even though they are mature when collected from the tree. The viability of some seeds is very short and they must be planted rather quickly. A few seeds must be cold treated before germination can occur.

Some of the seeds collected may have a fleshy pulp around the seed which must be removed. It can be done by washing in water and draining before planting.

Good seed can be checked by the flotation method. Place seeds in a bucket of water. Those that float to the surface should be thrown away. Good seed will sink to the bottom of the container. If the seeds are to be stored, they should be air-dried before placing in storage containers. Remember, seeds contain a living plant and should be handled with care.

Seeds that are to be stored should be fully ripe. Immature seed will not keep as well in storage as those that are mature. Hard coated seeds store much better than those with soft seed coats. Temperature fluctuations can cause low viability, especially if the moisture is high. The temperature most desirable for seed storage is 40°F. Use airtight containers for best results.

A number of excellent trees can be grown from seed. The redbud, magnolia, Acacia and Jerusalem thorn, however, need treatment for more rapid germination. Magnolia seeds need to be stored in an ordinary refrigerator for five or six months. The seeds can be placed in a plastic bag and stored. Check once-in-awhile for proper moisture in the bag. A light sprinkling may be necessary. Hard-coated seeds like Jerusalem thorn and redbud can be soaked overnight in water. When first placed in water, it should be 190°F. Dump in the seed, let the water cool then plant the next day.

Try growing ornamentals from seed. It is easy, but takes a little longer to get a tree for shade. Shrubs will grow more rapidly. Propagation of plants from seed is interesting and something anyone can do.

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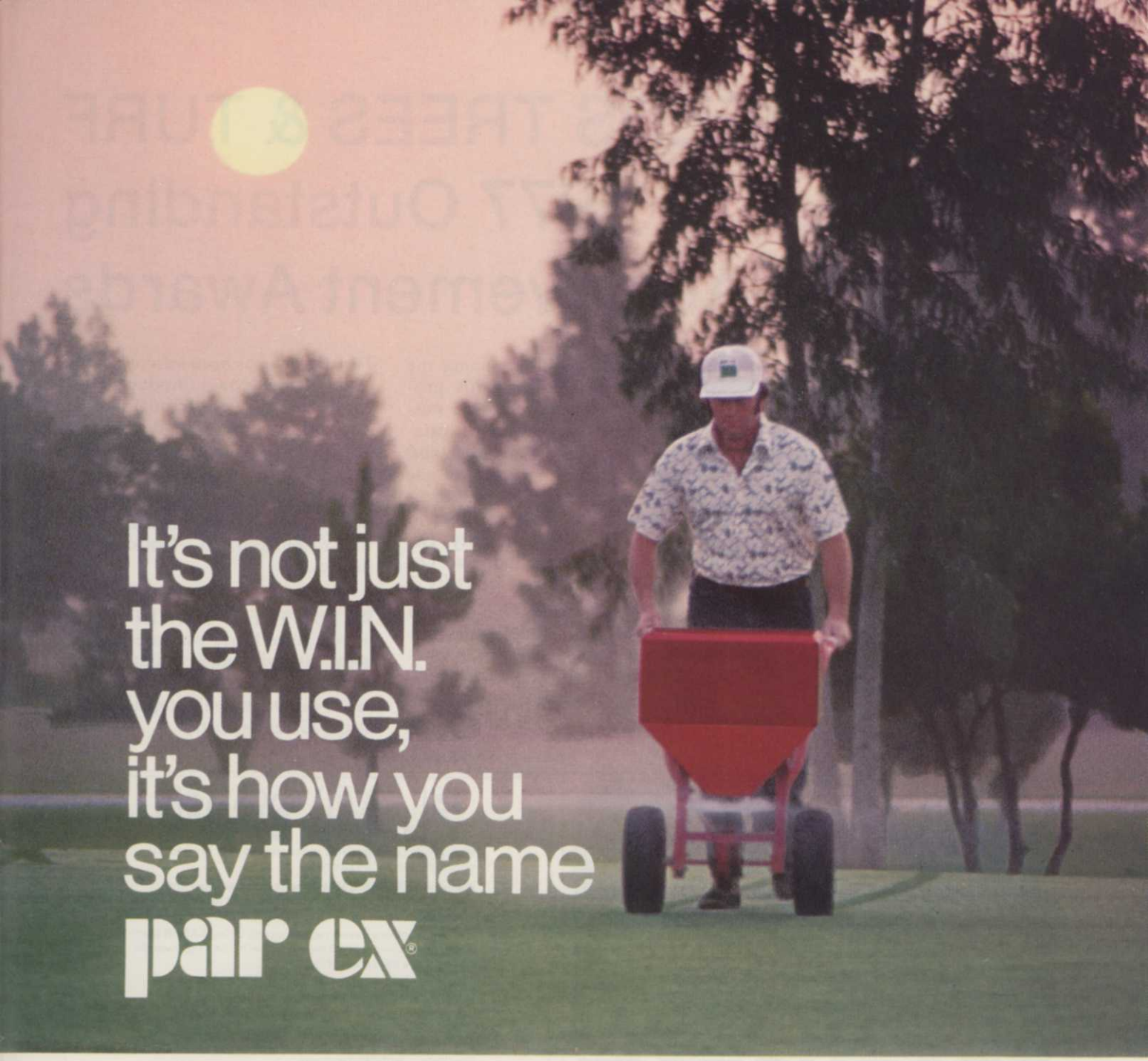

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WEEDS TREES & TURF 1977 Outstanding Achievement Awards

We are pleased to announce the winners of our 1977 awards program. The winners represent outstanding achievers in three categories and were nominated and selected by the four members of our advisory committee: Dr. Ray Freeborg, Purdue University; Dr. David Martin, Ohio State University; Dr. Fred Grau, Grasslyn, Inc.; and Dr. Henry Indyk, Rutgers University.

Dr. A. J. Turgeon, University of Illinois, has been selected as the winner in the research/educator category for his contributions to turfgrass research and education.

Mr. Wiley Miner, Princeton Turf Farms, has been selected as the winner in the grower/producer category for his contributions to mechanization of the sod industry.

Mr. Arthur L. Hathcock has been selected as the winner in the grounds manager category for his outstanding efforts as consultant to the Washington, D.C. Metro system project.

In announcing these awards, WEEDS TREES & TURF wishes to recognize those who are not the usual award winners, but whose initiative and leadership prove them to be, without a doubt, top achievers in the Green Industry.

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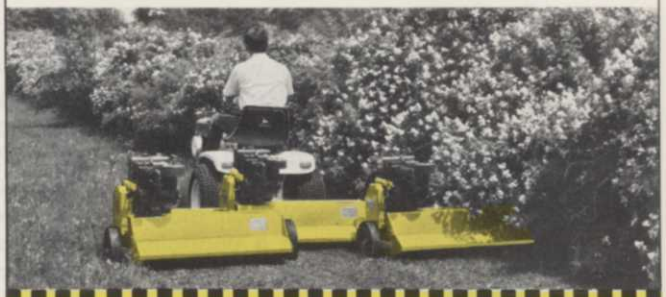

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Dr. A. J. Turgeon is Associate Professor of Turfgrass Science in the Department of Horticulture at the University of Illinois, Urbana. His principle areas of research include turfgrass community dynamics, cultural systems and herbicide action and metabolism. He is the author of over 160 scientific publications dealing with turfgrass science and technology. His teaching responsibilities include two courses and advising graduate and undergraduate students in Horticulture.

Dr. Turgeon is an active member of the International Turfgrass Society, American Society of Agronomy, Weed Science Society of America, Northcentral Regional Turfgrass Research Group, Northcentral Weed Control Conference, Sigma Xi, Pi Alpha Xi and Gamma Sigma Delta. He served as a member of GCSAA's Educational Advisory Council from 1974 to 1977. He has been chairman of the Illinois Turfgrass Foundation's advisory council since 1971.

Dr. Turgeon received a B.S. degree in plant science (turfgrass management) from Rutgers University in 1965. He then served in the U.S. Army in the U.S. and Vietnam from 1965 to 1968 as a helicopter pilot and instructor and was discharged with the rank of Captain.

He received his M.S. in 1970 and his PhD. in 1971, both in crop science (turfgrass weed control) from Michigan State University. He began his career at the University of Illinois in 1971 as Extension Turfgrass Specialist and Assistant Professor.

Outstanding among Wiley Miner's contributions to the sod industry, on the state as well as national level, was his early recognition of the need for mechanization of sod harvesting. His early pioneering efforts served as a stimulus for other efforts to develop harvesters which would improve the efficiency of harvesting sod.

Recently, he has unveiled an automatic harvester which, operated by a single operator, will harvest, palletize with cross-tying of sod pieces, automatically count, drop pallet and replace with empty pallet at a rate of up to 27,000 square feet per hour. This currently represents the top-of-the-line of Princeton Manufacturing Company's three models of harvesters that have evolved from the years he dedicated to sod industry mechanization.

Mr. Miner came to New Jersey in the early 1960's and began his sod production business, Princeton Turf Farms. His early efforts generated much interest in the production of high quality cultivated sod in New Jersey.

He initiated interest in the beginning of a sod certification program which was started in New Jersey in 1974. This was one of the first of its kind in the nation and served as a pattern for certification programs in other states.

He provided leadership in organizing the Cultivated Sod Association of New Jersey in 1964, which is still very active at present. He served as its first president.

On the national scene, he was instrumental in organizing the American Sod Producers Association in 1967 and served as its second president.

Arthur Hathcock is a landscape agronomist for Bechtel Associated in Washington D.C. At present, he is the management consultant to the Washington Metropolitan Area Transit Authority. As such, he is responsible for selecting and tagging at the nursery, all the plant material to be used for restoration of the jobsites.

He monitors the installation of trees, shrubs, groundcovers and bulbs. All the landscape contractors' materials must also be reviewed and monitored from samples submitted for acceptance.

Mr. Hathcock must ensure contractors' full compliance with specifications and planting details, through on site inspection and supervision, including the warranteed maintenance period.

He provides technical advisory service for areas to be topsoiled, seeded, sodded or established with Penngift crownvetch. He also samples subsoil and topsoil for fertilizer and lime recommendations.

Mr. Hathcock has endorsed the use of Penngift crownvetch for embankment stabilization on the project and has provided all the technical assistance needed to completely write and update the specifications pertaining to seeding, sodding and crownvetch.

The Washington Metropolitan Area Transit Authority consists of approximately 98 miles of track and extensive grounds. The value of the landscape material has risen from $100,000, four years ago when Mr. Hathcock began, to over three million today. It is estimated that it will be another ten years before the project is completed.

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Meeting Dates

ALCA Management Information Systems Executive Management Seminar, Sheraton Mockingbird Hotel, Dallas, Tex., Oct. 20-21.

International Society of Arboriculture, New England Chapter annual Meeting, Red Jacket Mountain View Inn, North Conway, N.H., Oct. 24-25.

Green Industry Seminar and Trade Show, Springfield-Oaks Park and Youth Activities Center, Davisburg, Mich., Oct. 25-26.

Twelfth Annual Golf Turf Symposium, Pfister Hotel, Milwaukee, Wisc., Oct. 26-27.

Washington-North Idaho Seed Association Annual Convention, North Shore Motor Hotel, Coeur d'Alene, Idaho, Oct. 28-29.

Professional Grounds Management Society Annual Conference, Stouffers Hotel, Greenway Plaza, Houston, Tex., Oct. 30-Nov. 3.

Texas Recreation and Park Society Annual State Conference, La Quinta Royale, Corpus Christi, Texas, Nov. 2-5.

ALCA Maintenance Symposium, Northlake Hilton Inn, Atlanta, Ga. Nov. 3-4.

Seventh Annual Colorado Crop Protection Institute, Colorado State University Campus, Fort Collins, Colo., Nov. 9-10.

California Landscape Contractors Association half-day seminars, Stardust Hotel, Las Vegas, Nev., Nov. 10-11.

American Society of Agronomy, Crop Science Society of America and Soil Science Society of America joint annual meeting, Los Angeles Bonaventure and Hilton hotels, Los Angeles, Calif., Nov. 13-18.

Irrigation Symposium & Equipment Show, Fresno Convention Center, Fresno, Calif., Nov. 16-19.

Tidewater Shade Tree Conference, Norfolk Botanical Gardens, Norfolk, Va., Nov. 17.

National Fertilizer Solutions Association 23rd Annual Convention & Chemical/Equipment Exhibition, Dallas Convention Center, Dallas, Texas, Nov. 28-Dec.1.

New Jersey Turfgrass Expo '77, Cherry Hill Hyatt House, Cherry Hill, N.J., Nov. 28-Dec. 1.

ACLA Management Information Systems Executive Management Seminar, Airport Hilton Inn, Denver, Colo., Dec. 1-2.

Ohio Turfgrass Conference and Show, Dayton, Ohio, Dec. 6-8.

ALCA Design/Build Symposium, Sheraton-Dallas Hotel, Dallas, Tex., Dec. 7-8.

International Society of Arboriculture, Indiana Chapter annual meeting, Stouffers Indianapolis, Indianapolis, Ind., Jan. 3-5.

Turf Grass '78, Maryland Turf Grass Council, Sheraton Lanham Inn, Lanham, Md., Jan. 8-12.

Western Association of Nurserymen Trade Show and 88th Annual Meeting, Hilton Plaza Inn, Kansas City, Mo., Jan. 8-10.

48th Annual Michigan Turfgrass Conference, Kellogg Center, Michigan State University, East Lansing, Mich., Jan. 10-11

Southeastern Pennsylvania Turf School and Trade Show, Westover Country Club, Jeffersonville, Penna., Jan. 10-11.

Alumni Association of the Niagara Parks Commission School of Horticulture Annual Educational Conference, Park Motor Hotel, Niagara Falls, Ontario, Jan. 12-14.

New Hampshire Turf Seminar, Sheraton-Wayfarer Motor Inn, Bedford, N.H., Jan. 12-13.

The Pennsylvania State University Turfgrass Conference, J. Orvis Keller Conference Center, University Park, Penna., Jan. 16-19.

National Conference for Forestry Research, Ramada Inn, Rosslyn, Va., Jan. 17-19.

Southern Weed Science Society 31st Annual Meeting, Braniff Place, New Orleans, La., Jan. 17-19.

Kansas Recreation and Park Association Annual Conference, University of Kansas Student Union, Lawrence, Kan., Jan. 18-20.

International Society of Arboriculture, Kentucky Chapter annual meeting, Executive West, Louisville, Ken., Jan. 19.

International Society of Arboriculture, Penn-Del Chapter annual meeting, Marriott Motor Hotel, Philadelphia, Penn., Jan. 19-20.

International Society of Arboriculture, Ohio Chapter annual meeting, Sheraton-Columbus, Columbus, Ohio, Jan. 22-26.

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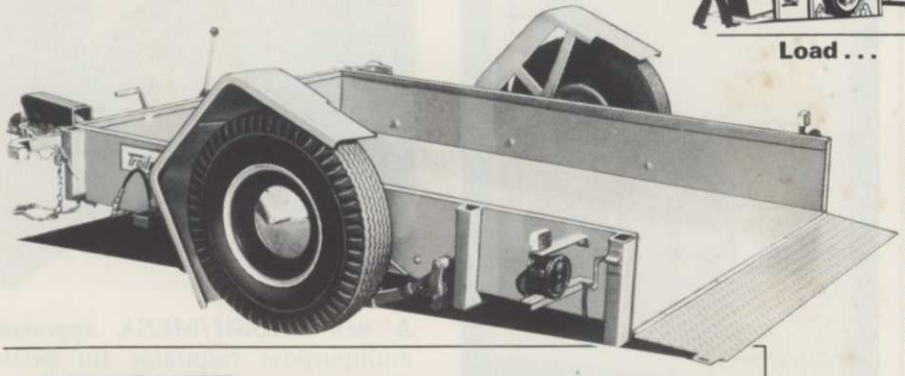

That's all there is to moving your equipment anywhere you want to. This unique Trailevator lowers to ground level for fast 'roll-aboard' loading, then lifts its own load to hauling position in just seconds. Lifts and lowers without uncoupling from towing vehicle. Standard trailer hitch attaches to car, truck or tractor. Four models available. Two capacities: 3,000 lbs. and 2,000 lbs. Bed sizes to 5'10" x 10'.

TILTSTER ***The low bed trailer that tilts.***

Drop-axle, tilt-type trailer handles loads to 5,000 lbs. Simple, one-man operation. Easy access, tailgate ramp for ground level or low platform loading. Single and tandem wheel models. Bed sizes to 5'10" x 12'.

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Choose from a wide range of pump designs and materials to suit your requirements: cast-iron, Ni-Resist and bronze pump housings... even nickel plating on piston pumps.

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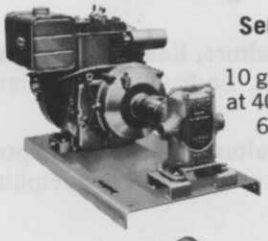

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10 gpm output at 400 psi with 6 hp engine

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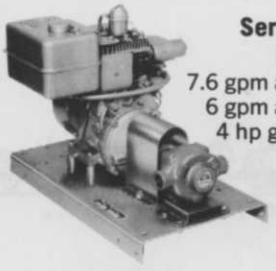
Choice of rubber or nylon rollers



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7.6 gpm at 100 psi
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Solo Motors 12½ hp Model 426, self-propelled high-concentrate mist blower is fitted with a 32-gallon tank for formula concentrations up to 10 times. It runs at two speeds forward and two in reverse. Speed ranges from 2-3 mph, with a formula discharge range from 1 quart to 4½ gallons per minute. Eight standard nozzles can be individually aimed and calibrated. Chemical penetration will exceed a total width of 40 feet. Standard cleated tires will climb 45-degree hills with ease, or optional low-pressure flotation tires may be used to bring compaction to near-zero.

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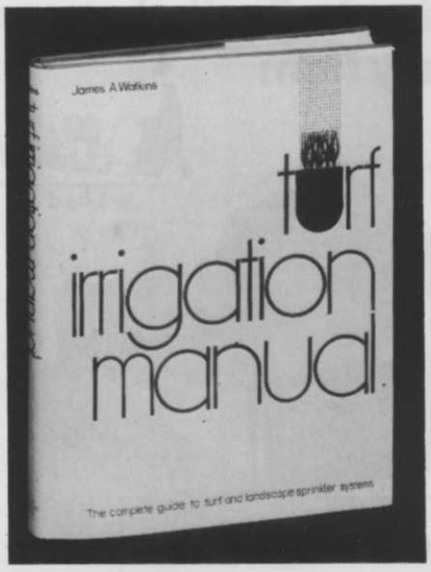

The all-new 3rd Edition *Turf Irrigation Manual* by James A. Watkins is now available from Telsco Industries. The Manual provides 350 pages of reference material for engineers, architects, designers, and contractors involved with sprinkler system design or installation. It is an excellent study text for academic students and the interested lay person. The book is layed out to take the reader step-by-step through the design process: equipment, basic hydraulics, sprinkler performance, plot plans, head layout, pipe sizing and zoning. In addition, chapters have been included to cover special subjects such as: rotary systems, golf courses, pumps, cross-connection control, clean water, electrical, and water hammer.

It also contains 60 pages of important reference tables including: technical symbols and abbreviations; piping pressure losses and velocities; multiplying factors for flow velocities; pressure losses in piping appurtenances; equivalents for pressure, precipitation, wind velocity, flow, length; pumps and strainer data; head layout constants; weight of water; electrical wire data; and U.S. metric conversion factors.

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A new NIOSH/MESA approved multipurpose respirator for pesticides, dusts and mists is now available from the Occupational Safety Marketing Division of ESB. This same respirator will also afford excellent respiratory protection against paint, lacquer and enamel mists. Especially designed to meet agricultural and industrial hazards

that are generated by pesticide applications and spray painting, the new 122115 Respirator has been proven more efficient than previous respirators at removing contaminant particles and vapors from the air. Although filter efficiency has been increased, the 122115 is no more difficult to breathe through than earlier models. Because of its multi-purpose applications, respirator inventory requirements are greatly reduced.

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The Herbi model, a lightweight, hand-held, battery-operated sprayer, is being marketed by Micron West. It features a rotary atomizer which insures correct sized droplets, enabling extra low-volume herbicide spraying. The atomizer spins at 2,000 rpm, converting the spray material into a hollow cone of even sized 250-micron diameter droplets. The disc is driven at constant speed by a 12 volt motor powered by "D"-size flashlight batteries. This insures even droplets, in an even dispersement of over 100 droplets per square inch for maximum spraying efficiency.

The Herbi is designed to utilize no more than the amount of active ingredient recommended by the chemical manufacturer, but with a fraction of the normal water required. Spraying at a slow walking pace, the 2½ litre bottle will give thorough spray coverage over ¾ acre or more.

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The Model 6421 is the newest pressure washer to be added to Citation's cleaning equipment line. The unit will discharge 240 GPH at 1000 psi. It comes complete with a stainless steel triplex pump, 3 hp, 220 volt, 1-phase, 60-cycle motor, float tank, dual chemical metering valve, 40-foot discharge hose and trigger control gun. Portable gear is optional.

The unit can be used independently as a cold water washer or in combination with a continuous water heater as a hot, high pressure washer.

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Promark has introduced the "Quarter Horse," a 3-wheeled, multi-purpose utility vehicle designed for power, durability and ease of handling. "Quarter Horse" vehicles, with engines by Kohler, will carry up to 1000 pound capacities and seat two comfortably. In addition to its many applications, the "Quarter Horse" offers a super quiet pack for golf courses. Promark stresses the low cost of the "Quarter Horse" operation, its durability, ease of maintenance, and initial cost factor.

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Catcher/Compactor — ingenious! Paddles pull and compact clippings into tight mass without noisy blower or dust. No loss of maneuverability.

Heavy duty 72" deck for rough cutting, discharges to rear.

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Classifieds

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Rates: All classifications 65¢ per word. Box number, $1. All classified ads must be received by Publisher the 5th of the month preceding publication date and be accompanied by cash or money order covering full payment. Mail ad copy to: Dorothy Lowe, Weeds, Trees & Turf, P.O. Box 6951, Cleveland, Ohio 44101.

USED EQUIPMENT

2 — 50' AERIAL BASKETS — 65' Aerial basket, 2 Asplundh brush chippers. 1 Vermeer tree mover, 1 Vermeer stump cutter. Small hydraulic crane, 2 John Bean sprayers, ten ton tri-axle trailer, 1 Prentice log loader, tractor with front end loader and Bobcat loader, Parkway Tree Service, 120626 W. Cherry, Wauwatosa, Wis. 414 257-1555.

1977 HIGH RANGER mounted on 1969 Ford F600, 16' bed, hydraulic prunners, $26,-000.00. 665 Vermeer stump cutter, $6,500.00. Six cylinder 16" Asplundh chipper, $5,000.00. Quitting tree work, call or write for photos and more information. Cannady Tree Service, 21880 West Ireland Road, South Bedn, Indiana 46614. 219 291-5115.

1972 BOWIE IMPERIAL hydro-multcher 2,500 gallon, worked 220 hours, like new, mounted on 1972 GMC 427 V-8 6500. Heavy duty suspension thru-out. 18' steely body, 17,000 original miles, excellent condition. Total cost $18,500.00. Banak Nursery, Inc., Berlin, Connecticut. Phone 203 828-5654.

SEVERAL 50 FOOT SERVI-lifts mounted on GMC trucks. Call 401 725-2250.

FOR SALE — 1975 Vermeer TS-22" tree spade. Mounts on Bobcat or 3 pt. hitch. Excellent condition. $1800.00. 1976 Care tree 30" tree spade. Mounts on Bobcat or 3 pt. hitch. Mint condition. $2995.00. 1976 Care tree 36" tree spade. Mounts on 990 Bobcat, tractor, loader, or dozer. Mint condition. $4495.00. 1972 Vermeer TS-44T tree spade on 1974 GMC 1 ton. New spades. Good condition. $7800.00. Will send photographs upon request. Call or write: Spartan™ Tree Transplanting Equipment Company, 16084 S. Chandler Rd., East Lansing, Michigan 48823. Phone 517 351-1370. (We buy, sell, and repair high quality tree transplanting equipment).

FOR SALE: Vermeer "80" clamshell tree mower, like new, all hydraulic power, factory mounted on '68 Chevrolet truck with under 11,000 actual miles. Will deliver anyplace in continental USA for only $12,500.00. Randall & Blake, Inc., 6000 So. Old Mill Road, Littleton, Colorado 80120. Phone 800 525-9497.

VERMEER 671 LOG CHIPPER with GMC 4-53 diesel engine. Like new with only 74 total hours on tach. $18,500 (new price is $38,000). 100 foot Arlo crane mounted on Mach truck. Brand new auxiliary generator to run crane, and has optional bucket for crane. $10,500. Vermeer no. 10 stumper, completely reconditioned. $3,100.00. ESSCO, 5620 Sunrise Hwy.,Massapequa, N.Y. 11758. 516 799-7619.

1973 TS-66T VERMEER tree spade of 1973 GMC 2 ton truck with power steering, positive traction, 5 speed transmission, 2 speed rear end. Mint condition, like to sell — make reasonable offer. Lawhon Nursery, 1729 West Madison, Bastrop, La. 318 281-5596.

1960 FORD F600, very good condition, all major components re-built, custom made body with a 1972 John Bean sprayer 600 gallon tank, 50 GPM pump, with automatic refill attachment, good condition, $3,000.00. Call (914) 561-3490.

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FOR SALE: Hahn TT1200 Tournament Delux triplex greens mower with 3 greens reels and catcers and 3 utility (tee) reels. Very good condition. List price $7,186.00, selling price $3,500.00. Tucson Fertilizer, Tucson, Arizona 85717. 602 294-3401.

FOR SALE: Hahn TT1201t Tournament II triplex greens mower with 3 green sreels and catchers. Very good condition. List price $5,-086.00, selling price $2,500.00. Tucson Fertilizer, Tucson, Arizona 85717. 602 294-3401.

1964 50 FOOT SKYWORKER on International with chip box, hydraulic outlet, 22,-000 miles, extra clean, asking $17,800. Edwards Tree Service, 3190 Cooper-Foster, Vermilion, Ohio 44089. Phone 216 967-6750.

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FOR SALE: Ransome 3601 20" Auto Certes greens mower. New (in crate). Selling price $450.00. Tucson Fertilizer, Tucson, Arizona 85717. 602 294-3401.

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1975 JACOBSEN F20 diesel 9 gang fairway mower. Priced to sell. Delivery to be arranged. Phone (801) 255-7185 collect.

FOR SALE; Foley no. 384-01 bed knife grinder. New (in crate). Selling $275.00. Tucson Fertilizer, Tucson, Arizona 85717. 602 294-3401.

TELEPHONE INSULATING EQUIPMENT for sale. Very reasonable. Contact Bob Hooper, Monroe Tree & Landscape, Rochester, New York. 716 436-2900.

1975 GOOSENECK TRAILER with electric hoist, 14' bed, $3,000.00. Don Leimeister, Berlin Heights, Ohio 44814. Phone 419 588-2026.

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SOD QUALITY Seeds Merion, Fylking, Delta, Park, Newport, Nugget, Adelphi, Cheri, Glade and Baron bluegrasses also fine fescues. Manhattan ryegrass. Custom mixing available. Michigan State Seed Co., Grand Ledge, Michigan 48837. Phone 517 627-2164.

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DAVEY HAS AN IMMEDIATE OPENING for a turf specialist on our rapidly expanding lawn spraying service. Applications will be accepted until November 15, 1977. Applicants must have: 1. Doctor or Masters degree. 2. Practical experience in turf, golf course or landscape industries. 3. Ability to communicate with customers and field service personnel. 4. Ability to conduct in-house training programs for lawn care personnel. Send resume to The Davey Tree Expert Company, 117 South Water Street, Kent, Ohio 44240. An equal opportunity employer

LANDSCAPE CONTRACTING FIRM needs a special person, preferably Landscape Architect; but with sales, supervisory, and management ability. We are an eight year old company showing outstanding growth in a very competitive city; Houston, Texas, and need someone we can make a partner in the firm when they prove themselves. Please send resume and compensation requirements to: Fraser's Landscape, 9310 Dowdell Road, Tomball, Texas 77375.

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Continued on page 58

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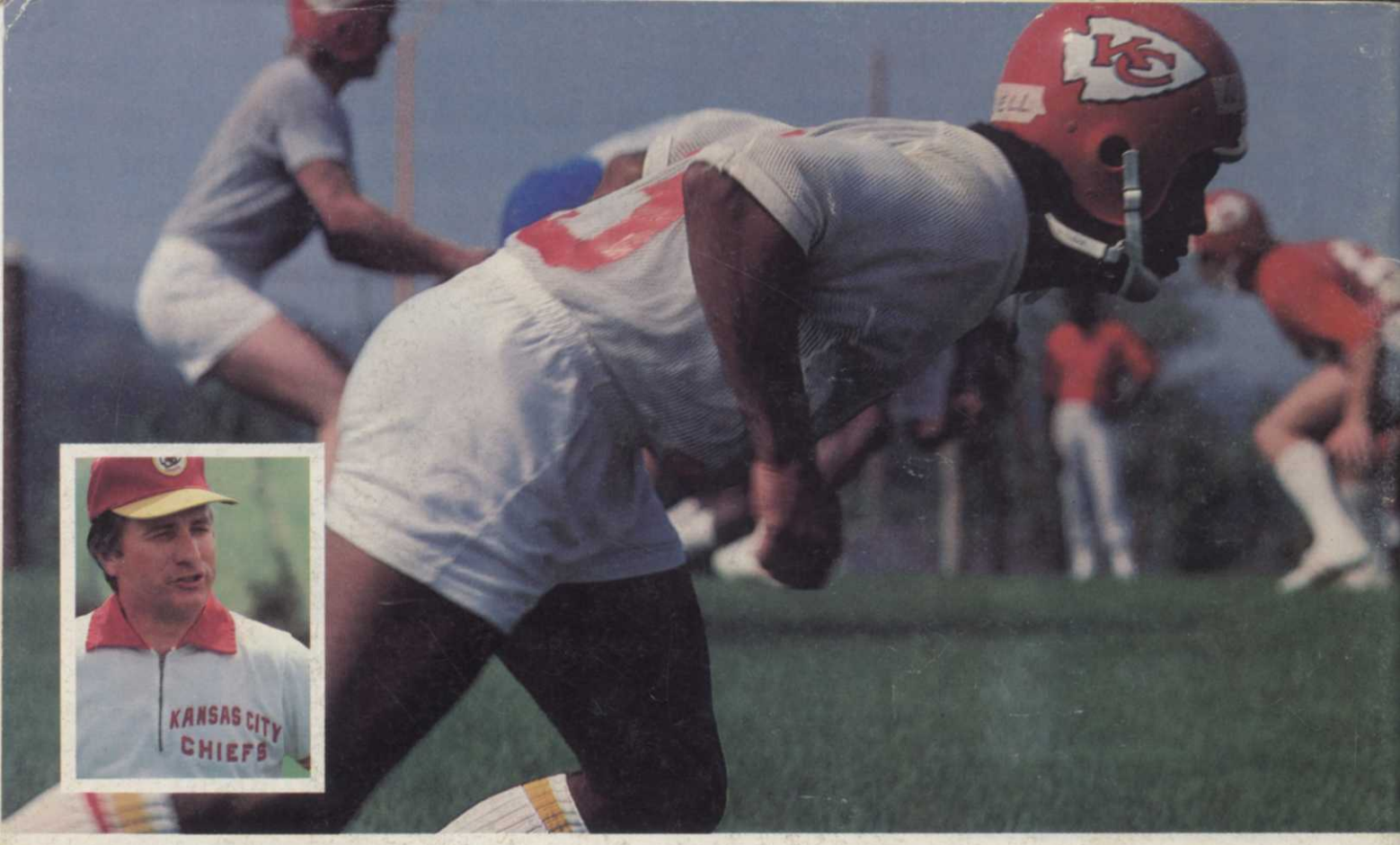

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